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OFFENSIVE FIGHTING

BY

MAJOR DONALD M. McRAE, M. C.
INFANTRY RESERVE CORPS
(Formerly Major Canadian Infantry)

THIS BOOK HAS BEEN AUTHORIZED FOR PUBLICATION BY THE SECRETARY OF WAR, UPON RECOMMENDATION OF THE GENERAL STAFF

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TO

M. A. W.

FOREWORD

MUCH has been written on different phases of the Great War.

Offensive Fighting has a message for the Scouting and Raiding Officer.

It is the junior officers who are called upon to perform the hazardous work in No Man's Land—scouting and raiding.

Major McRae has been "over there" and has learned by actual experience. This gives weight to the things he tells. He presents a mental picture of some of the problems that officers performing similar service will have to solve when they get into action. I heard his lectures and considered them extremely interesting, instructive and valuable.

JOHN J. BRADLEY,
Colonel, General Staff, United States Army.
War College Division.

February, 14, 1918.

PREFACE

THE object of this book is to place in the hands of officers and men of our new Army, some of the details of the work it took me months of labor and the probable sacrifice of lives to learn. Some day you will have to do the same kind of work I had to do and I hope when that time comes this book may help you to avoid making some of the mistakes I have made, as well as some of those made by others.

Many of the details of the game change rapidly, but when the time comes the changes are self-evident and the details here presented will at least give you something to work upon, and may prevent the omission of some minor detail that would cause your show to fail.

The chapters are arranged in convenient lecture form. Get the information to the men. They will have to use it with you.

DONALD M. MCRAE.

February 9, 1918.

CONTENTS

CHAPTER PAGE

I. MINE CRATER CONSOLIDATION.................... 13

II. TRENCH RAIDS.................................... 31

III. PATROLS AND THE CONTROL OF NO MAN'S LAND.... 59

IV. FRONT LINE OBSERVATIONS...................... 86

V. CO-OPERATION BETWEEN INFANTRY AND ARTILLERY. 115

VI. INFANTRY IN ATTACK............................ 130

VII. TRENCH ROUTINE.............................. 169

VIII. NOTES ON USE OF PRISMATIC COMPASS............ 186

OFFENSIVE FIGHTING

CHAPTER I

MINE CRATER CONSOLIDATION

A. OCCUPATION OF MINE CRATERS

1. Tactical Reasons for Blowing.—The occupation and consolidation of mine craters presents many difficulties and all ranks should understand the principles to be acted upon should a mine be exploded upon their front.*

There are two main reasons for exploding mines:

(*a*) As a preliminary to an attack by us on the enemy lines, as was the case at Messines Ridge. These craters usually have their center under the enemy's front or support line and are of immense assistance to the attackers as they shatter the enemy morale, create great confusion, and destroy all defences in the area affected. There is nothing that lowers the morale so much as to have a mine explode in the immediate vicinity. The knowledge that a flank is thus exposed, the uncertainty as to the extent of the damage and the possibility of another mine exploding under their feet, is enough to shake the most veteran troops. The enemy may blow a crater under our lines for the same reasons.

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* There is a great variation in the size of mines. Montreal Crater on Vimy Ridge is about an average and is nearly 100 yards in diameter and 90 feet deep. This took almost 24 tons of ammonal and is in chalky ground.

(*b*) A mine may be exploded as a defensive measure, such as the blowing of Montreal Crater on Vimy Ridge. This is done when the enemy is placing or has already placed a mine under our line and in this case the entire object of our mine is to destroy the enemy's mine galleries and thus prevent him from exploding his mine. If we can destroy some of his line and inflict casualties in addition, it is just so much gained, but the primary object is to save our own line from destruction.

2. ADVANTAGES OF OCCUPYING A CRATER.—(*a*) *Turned Into a Strong Point.*—When an offensive crater is blown the attack usually pushes well ahead and the crater is left behind our lines. It should be turned into a strong point at once and thus form a good position for our troops to fall back on and one that will be valuable in assisting to hold up an enemy counter-attack.

When the crater is formed during a defensive action or enemy offensive, if occupied by us, it makes an advanced post that should be held as long as possible.

(*b*) *Gives Command of Ground.*—When the crater is occupied the post is usually on the lip and considerably higher than the surrounding area. It will be well in advance of our lines and in a good position from which to bring enfilade machine-gun fire to bear across No Man's Land. Often from this high advanced post an excellent view can be obtained of the enemy's back lines that is very useful to artillery Forward Observation Officers. This was the case at Montreal Crater. The crater post was about the only place along the Vimy Ridge from which any view could be obtained of the back side of the Ridge. Before this mine was exploded the enemy had a fine view of all our defences, while we had no observation of his lines at all. As a result the Germans kept up a very nasty artillery and trench mortar fire that it was hard for us to answer with any accuracy, as we were firing blind. After we got the advanced post on the crater lip we could see some of his lines and send back a much better fire. There was a let up in the German fire at once.

(*c*) *Forms Obstacle.*—The actual hole forms a considerable obstacle that will break up an enemy attacking formation and cause it to become bunched around the edge where a strong post with a machine gun can do considerable damage, if not hold up the attack.

(*d*) *Assembly Point.*—If we have control of a crater it may be used as an assembly point for a raid or attack, if it is dry. It will offer excellent cover from observation and rifle fire, and with a trench dug just inside the far lip offers a good " jumping off " position well across No Man's Land. If the crater is muddy, though, it is a bad place to get into, as it is almost impossible to get out again.

3. CONSOLIDATION.—(*a*) *Enemy Not Mining* (see Fig. 1).—(*a*) In this case the far lip is usually consolidated. Immediately upon the mine going up parties must be rushed forward to take possession as explained later.

(*b*) The officer in charge marks out the posts to be dug and sets the men to work. As a rule three posts are dug as in Fig. 1. These posts are the first thing done, so the party will have some sort of cover when the counter-attack comes.

(*c*) As soon as the posts are done it is necessary to establish communications with the old front line. First a trench is dug around the inside of the crater at about ground level. This trench should join up the short communication trenches from the posts and continue until about half way around the crater. At this point tunnel through the lip if possible; if not, cut through and carry the trench in a zig-zag back to the front line. Never dig through the lip in a line perpendicular to the enemy's front line, as the cut would show up plainly against the sky line and be a good target. While the posts and inside communication trenches are being dug, it is well to have parties working on the communication trench from the front line to the crater, so as to save time. Both the posts and semicircular communication trench must have strong parados, for the crater is a good target for shell-fire and a shell falling in the crater throws fragments upwards.

(*d*) It is important to get out wire entanglements just as soon as possible. For the first half hour after the mine has exploded there is more or less of a lull while the enemy is getting straightened out and his artillery is locating the crater. During this time much of the wire must be gotten out to protect the posts from the counter-attack.

(*e*) When the work has been carried this far, dugouts should be constructed. They should be dug *into* the slope of the crater and not at the bottom. Here they will be safer from shells, drier and easier to dig. There should be a gentle slope from the back of the dugout to the crater for drainage. If French dugout material is used these shelters can be quickly completed.

All trenches must be revetted, as dug, or they will not stand any time, in the newly turned earth. Corrugated iron, U-frames and wooden walks (bathmats) are very good. If corrugated iron cannot be used expanded metal will do.

(*b*) *Enemy Mining* (see Fig. 2).—(*a*) In this case the near lip is consolidated so that the post cannot be destroyed by an enemy mine; as the crater is too deep for a gallery to be driven under it without excessive time and labor. The enemy galleries in the immediate vicinity will be destroyed, but if he has his tunnelers and apparatus on the front and his shafts dug it would be easy to put in a drift or gallery under the post.

(*b*) When the mine is exploded the parties rush forward and the officer sights two posts and the communication trench as shown in Fig. 2.

It is best in this case to dig one sap from the front line and have it break into a Y at about point X. "T" heads are dug at the ends of the branches and just on top of the lip. The communication trenches from X to each of the posts should be dug at the same time that the posts are and the sap from the front line dug by a special party just as soon as possible. When the officer, during the advance, leaves our last trench for the open he should lay a tape, as he goes, to mark the positions where he wants the sap, the Y and the posts dug. These tapes also help to guide carrying parties and stretcher-bearers to the garrisons.

(*c*) A French dugout should be put in at X.

(*d*) Special wiring parties must be detailed and start work at once to put wire around the inside of the crater, the posts and back along each side of the sap to the front line wire. Knife rests or *barbed* concertina wire should be used. This barbed concertina wire is by far the most rapid to put out and when done forms an almost impassable barrier. It is difficult to obtain, but every effort should be made to get it, as it is possible to put out as much in half an hour as it would take all night to put out if ordinary barbed wire were used.

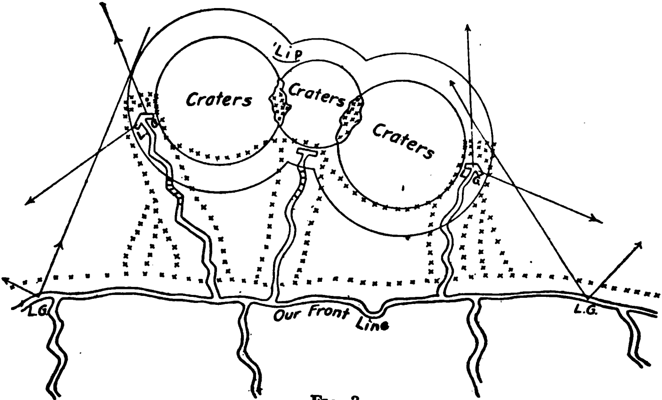

FIG. 3.

(*c*) *Conversion of a Number of Craters Into a Strong Point.*—This task is fully illustrated by Fig. 3.

4. ARTILLERY, TRENCH MORTAR AND MACHINE GUN BARRAGE (see Fig. 4).—The object of the barrage is to silence the enemy's fire and to break up counter-attacks. The explosion of the mine must be zero and there should be no firing before that or the enemy will be warned and lay down his barrage before the parties get out into No Man's Land and thus cause heavy casualties. At zero all arms should open together.

Heavy guns should engage local strong points, that may conceal enemy machine guns, such as mine buildings, farms, commanding ground, known machine-gun emplacements, etc. They should also concentrate on known or suspected headquarters so as to prevent the issue of orders for counter-attacks and cut wires to artillery headquarters.

9.2″ and 8″ Howitzers usually work on the buildings.

6″ Howitzers on Headquarters, Machine Gun and Trench Mortar emplacements.

4.5″ Howitzers on trench junctions and large dugouts.

18 pounders (3″ approximately) and trench mortars on front and support lines.

60 pounders on enemy batteries.

Our machine guns should put up a heavy cross barrage behind the enemy's front line to prevent counter-work across the open while the artillery makes the trenches impassable.

Auto rifles for 800 yards on each flank should keep up a rapid fire on the enemy front line to keep down rifle fire as much as possible.

5. GENERAL REMARKS (Consolidation of a near lip).—The crater will probably be about 90 to 150 feet deep and 100 to 300 yards wide.

(*a*) *Storming Parties.*—There should be a party of about 40 men detailed to capture, hold and consolidate the crater. This party should be composed of two sections, one of which digs each of the posts. These sections actually dig the posts and saps back to where they meet the digging party working out from the front line. A normal composition for such a party is as follows:

1	Officer
1	N. C. O.
4	Engineers
20	Privates
3	Auto Riflemen
1	Auto Rifle N. C. O.
2	Stretcher Bearers
2	Runners
6	Bombers
40	Total

Each section might consist of

2	Engineers
10	Privates
12	Total

These men actually dig. The remainder act as a covering party.

Each section should have a reserve section of the same composition waiting at its dump to reinforce it if necessary. Fairly heavy casualties are to be expected in work of this kind, for the men are working in the open and no matter how good our barrage is the enemy fire will not be completely silenced. A battalion blowing a crater will probably lose from 80 to 100 men if the enemy does not counter-attack in force. If he does there is no telling what the casualties may be. Most of these casualties will be in the trenches back of the crater.

While the party is digging they are covered by the auto rifle and 6 bombers, leaving 24 men to actually dig. Sappers and N. C. O.'s must dig also, besides supervising the work.

Besides the actual storming parties men must be detailed to re-dig our front line and communication trenches if the mine is close to the line. The number of men needed for this work depends on the forecast given by the Tunnelling Officer. In digging one man per 1½ yards is about correct.

(*b*) *Equipment of Storming Parties.*—Every private except bombers, Nos. 1 and 2 of auto rifle section, runners and stretcher bearers, should carry the following:

Rifle and Bayonet
170 Rounds S. A. A.
3 Bombs
1 Shovel
10 Sandbags
1 Full Water Bottle
2 Days' Emergency Rations.
1 Field Dressing (shell dressing, if available, as most wounds are shell wounds).
1 Steel Helmet
1 Respirator
Identity Discs.

Bombers should not carry fixed bayonet or sandbags, or shovel, but should carry all the bombs possible (about 20). They should carry a rifle and 50 rounds S. A. A.

Nos. 1 and 2 Auto Rifle Section do not carry rifle, bayonet, shovel, S. A. A. or sandbags, but carry revolvers and remainder of equipment.

Runners do not carry bombs, bayonets, shovels or sandbags. They carry rifle and 50 rounds S. A. A. and the remainder of the above equipment.

Stretcher bearers carry no arms, sandbags or shovel, but have all the remainder of the equipment besides a stretcher per two bearers and their first aid cases.

The party may be cut off by a barrage before communications are established with the front line, so it is important that rations and water are carried.

Attached to each party is a carrying party of 1 N. C. O. and 3 men who endeavor to bring up any materials needed and help the stretcher bearers on the return trip. They should come forward immediately after the storming party and bring up two or three picks and as many bombs as possible.

The officer and N. C. O. should each carry a "Very" pistol and white and colored lights, the latter for S. O. S. signals. The officer should also carry a flashlight, as it can be used to signal with if everything else fails.

To dig the communication trench from the front line to the crater party a party should be detailed so as to have one man digging about 1½ yards.

The secret of success in an operation of this nature is to put plenty of men to work at once, after the mine explodes, so that all may have some sort of cover before the enemy "comes back."

(*c*) *Assembly Trenches.*—In selecting the assembly trenches for the storming party it is necessary to ascertain from the Tunnelling Officer what will be the danger zone. This is a varying distance and depends on the nature of the ground and the size of the charge. In the case of Montreal Crater this distance was 300 yards. This was in a chalky ground with about 24 tons of ammonal as a charge. After ascertaining this distance pick out the most convenient communication trench for the assembly and select a point on it outside of the danger zone, for the assembly point. The party should be lined up in file in a trench parallel to the direction of the ground shock, as a trench running in this direction is much less likely to cave in and bury the party than one perpendicular to the shock. The direction of the push is of course along radii from the crater.

If another crater or a deep depression is between the mine and the assembly trench, it is very likely to absorb much of the shock.

The majority of the débris falls very close to the crater, thus forming the lip with an ordinary mine; there is little danger from the falling earth at 300 yards.

In forming up, the men should be arranged according to the speed with which they can travel, with the fastest in front, as it is essential to get somebody to the crater as soon as possible, and also to have as many as possible dodge the first enemy barrage which will fall on the front and support lines. The officer must be careful, though, not to go ahead too rapidly, as he is not loaded down like the men and may lose his party. The men with the lightest loads can be placed in the lead so as to get some one to the lip as quickly as possible and hold it if any enemy try to capture it.

The following formation has been successfully used (Fig. 5):

As soon as the débris has settled the party moves off as fast as possible up the communication trench. As soon as the officer reaches the point where the trench has been destroyed he fastens one end of his tape and with the help of an engineer lays it to the lip of the crater. It must be remembered that our front line may be destroyed by our own mine and that it may be necessary to get into the open very shortly after starting. He must now be very careful to take a good look around and make certain just how the land lies and then lay tapes to the points he selects for the posts. His next move is to place his men in position and start them digging under direction of the engineers. He then makes certain that the covering parties are in proper positions and then goes back to see if the communication trench from the front line is being started properly. From this point on there is little for the officer to do except superintend the work, order up supplies as needed, see to the evacuation of wounded, if possible, and make certain that he is not surprised by an enemy counter-attack. If the attack comes the covering party drops back and all drop their shovels and, using what cover they have, put up a fight to the finish. No man should be allowed to lay down his rifle while digging, but should carry it slung. If once laid down in the mud and dark the rifle will very likely be lost.

As soon as the consolidation is well under way a message to that effect should be sent back to the officer commanding.

There should be fighting troops held in readiness in nearby trenches to re-take the lip if a counter-attack is successful and then the reserve party at the dump can come up and carry on the work.

(*d*) *Dumps.*—Just previously to the blowing of the crater, dumps should be established. There should be a dump for each party. They should be located in the most sheltered spot available and not more than 250 yards from the front line, as a greater distance would mean too long a trip through the enemy barrage. These dumps should not be established until the night before the operation, as enemy aircraft may observe them or the carrying parties and surmise what was going on and then the dumps would be put out of action the first thing on zero night. For the same reason the parties should not approach their dumps in large numbers, although every man should be shown the location of his dump, the advanced Headquarters, the dressing station and the route he is to go over in the operation. If it is desired to show the men the spot where the crater is to be, make them look through periscopes, for if the enemy sees a number of heads looking over the parapet at one spot in No Man's Land it will be easy for him to guess there is a mine going up. If he once knows this he will remove his posts, lay his artillery on the spot, move up machine guns, arrange attacking parties and our men will be the surprised ones at the reception they get instead of his.

For a party of the size mentioned the dump should contain approximately:

30	Shovels
10	Picks
500	Sandbags
10	Coils French *Barbed* Wire (concertina)
10	Spools Barbed Wire
19	Long Screw Stakes
38	Short Screw Stakes

5 Boxes S. A. A. (5000 total)
28 Boxes Mills No. 5 Grenades (336 total)
10. Packages White "Very," Light Cartridges (60 total)
2 Packages Red "Very" Light Cartridges, for S. O. S. signals
2 Packages Green "Very" Light Cartridges, for S. O. S. signals
3 "Very" Pistols (1")
6 Wire Cutters and Gloves
1 French Dugout
Bathmats
Revelling Material
2 Axes
10 Gallons Fresh Water
6 Stretchers
2 Rolls Screening Canvas (to lay as a walk for carrying parties if the débris is too muddy to walk through).

Besides these dumps there are separate dumps for each wiring party and for each of the trench-clearing parties. The equipment that the men carry with them is taken from the dump so, after the party moves off the dump is much smaller. Sentries should be placed over the dumps to be certain the material goes to the proper party and is not stolen before the fight by other units.

(*e*) *Signals and Communications.*—After the enemy barrage has opened it is a very difficult matter to maintain communications, especially if the operation takes place at night, as it probably will do. During daylight visual signals (signalling shutters) can be relied upon if the barrage of the enemy is not too heavy to see through, but at night runners are about the only resource and they are not certain. There is practically no chance of a telephone wire lasting more than a few moments, though it does no harm to try.

It is a great waste of life to send runners through a barrage and it should not be done except for urgent messages.

An alternative for runners is to empty a rifle grenade and place the message inside. The lighting portion of a "Very" light cartridge with a time fuse attached is then tied to the grenade. The fuse is lighted and the grenade fired at some prearranged spot, preferably a valley or gully (to afford cover). The light starts to burn after the grenade strikes and guides a man to the message. As nearly 300 yards can be gotten with these grenades they can be used with considerable success. They are quicker than runners, more certain of getting through, and save life.

At times a signal lamp or flash can be used, but they are liable to be quickly put out of action and draw fire.

For S. O. S. signals a prearranged volley of colored "Very" lights can be fired back over our lines. These should only be used in case of an attack that the post cannot easily handle and where artillery and supports are wanted. Ground flares may be used if it is thought that a small colored "Very" light would not be noticed amidst so many colored lights that the enemy will send out. The ground flare cannot be missed or mistaken, but it will draw machine-gun and artillery fire and be a dead give away of the post's location unless lighted from a distance to one side.

All runners should wear a white armlet so as to be readily recognizable and must have "right of way" over everyone.

(*f*) *Supports and Reserves.*—As so many men will be taken from the battalion, in the line, for the different parties, it will probably be found necessary to bring up two companies of the support battalion to help man the depleted line. The Reserve units need not be bothered, but should have their orders as how to act if called upon.

(*g*) *Training.*—If time permits, the storming parties should be taken out of the line and trained over ground laid out to represent the lines. This will give them a good idea of the distances, etc., and prevent confusion. The trenches are dug (1 foot deep) and the crater indicated by tapes.

(*h*) *Precautions.*—There should be two days' reserve rations on hand for the entire battalion, as the enemy barrage may prevent transport coming up. Each man in the line should carry 170 rounds S. A. A. and two bombs. Extra bombs should be moved forward to support line bomb stores.

(*i*) *When Enemy is Mining.*—When it is known that the enemy is prepared to explode a mine under a certain sector, the danger zone should be cleared except for flying sentries, all the above parties detailed and shown the assembly point, the artillery concentrated, etc. In fact, the same action is taken as if we were going to explode the mine ourselves, the only difference being that the zero hour is uncertain. For this reason the parties must continue to do trench duties. As soon as the mine explodes our barrage is laid down and each man detailed gets to the assembly point as rapidly as possible without further orders. From here on the action is the same as before, except that there will be more casualties, as the enemy has his artillery ready and we may have to take the lip away from him.

If the crater is well out in No Man's Land the near lip can be consolidated, but if it is in our front line the far lip should be consolidated and our front line run in front of the crater. This will necessitate a counter-attack to take the ground away from the enemy. This attack must be made by large numbers *at once.* The closer these attackers get to the enemy consolidating position the safer they are from the enemy artillery.

It is often advisable to organize a raid to go over at the same time the crater is being consolidated and it should go into the area just back of the crater. The enemy will be so confused that he can offer little resistance and it should be easy to gather up a number of prisoners. Besides this the presence of our raiding party may prevent the first counter-attack from being organized. At least it will form additional cover for the consolidation and might just as well go over as the barrage has to be put down anyway. A slight variation in the barrage would be necessary.

CHAPTER II

TRENCH RAIDS

DEFINITION.—A raid is a minor operation in which a limited number of men, either with or without artillery support, enter the enemy's lines, hold them for a limited time to obtain information and inflict casualties, and then return to their own lines with no attempt at consolidation.

1. OBJECTS.—(*a*) To capture prisoners and documents for the Intelligence Branch of the Staff. This information is of vital importance and is the primary object of a raid. At certain times, such as just before an offensive, prisoners must be had at all costs and raid after raid will be sent over regardless of loss, until the information is secured. The identification discs on these prisoners establish what unit is opposite and if these identifications are secured all along the line, every unit in the German army can be placed and a map drawn showing this disposition. If a concentration takes place it will be detected at once and we can make a counter-concentration.

(*b*) To ascertain the method and strength with which the enemy line is held.

(*c*) To raise our morale and foster an offensive spirit. If troops can send over a number of successful raids the feeling that they thus get, that they can enter the German lines at any time, kill the garrison and then get away, is of great benefit in raising their morale.

(*d*) To lower enemy morale. Few things lower the morale more, or in other words " get up the wind " more, of troops than successful raids against them. A raiding party shows no mercy and after taking one or two prisoners kills all other enemy it can. After a few raids an enemy is very jumpy, throwing bombs into his own wire, employing constant machine-gun and rifle fire and firing many flares. When troops get in this state they have lost their morale and their fighting value is greatly lowered.

(*e*) To search for gas cylinders, mine saps, machine-gun and trench-mortar emplacements, etc.

(*f*) To cause the enemy to show his barrages before an attack. Before the raid special men can be detailed to plot the lines of the enemy barrage. If, just before a big offensive, a number of raids are sent over, at the same time, the Germans are apt to think the attack has started and put down his full-strength battle barrage. If this is carefully observed and taken into account when selecting " jumping " off trenches, routes for carrying parties, etc., many casualties, in the attack, may be prevented.

(*g*) To collect loot, examine and destroy trenches, dugouts, machine guns and trench mortars. If a mine sap is found it should be very carefully destroyed.

(*h*) To cause casualties to enemy in back areas by forcing him to cause his reserves to " stand to " and offer an artillery target.

(*i*) As a retaliation for an enemy raid. These should be especially vicious and destructive affairs and at least five Germans killed or captured for every one the German raid got. The object is to make them realize that it does not pay to attempt to raid our lines.

On the British front in 1917, there were a very large number of successful British raids and very few successful German raids or even attempted German raids.

This was due partly to the vicious and certain retaliation the British always gave in return and in a greater measure to just plain British supremacy in all branches. With the number of auto rifles, now on the British front, the close coöperation with the artillery, the Mills bomb, and the fine morale of the men, the Germans find it practically impossible to secure prisoners from the British front line. With the large number of auto rifles now on our fronts, it should be impossible for the enemy to raid us. Even the best of barrages will fail to put all of these guns out, where there are so many, and only one is needed to cause a raid to fail. Besides, we should have control of No Man's Land, and get advance warning.

2. Selection of Ground.—In selecting the point to be raided there are a number of factors to be borne in mind. Of course the most important thing is to be certain that the enemy occupies the place selected and if possible to find out approximately the number of men in the trench. This work is done by patrols. The point selected should be a salient and difficult to reinforce,

there should be numerous dugouts and a machine-gun or trench-mortar emplacement, if possible. There must be favorable ground for the approach and withdrawal and no commanding ground in the immediate vicinity from which machine-gun fire may be directed on the raiders. The enemy wire is of secondary importance, as, no matter what its condition, the artillery can destroy it. Besides the above there should be as few communication trenches as possible for, either the garrison to escape through, or reinforcements to come up through. It is well to have a communication trench at each end of the objective, as it is a very useful landmark, as to how far it is safe to work and not come too close to the end of the box barrage, and also shows the location of the gap to get out by. During a night raid it is practically impossible to form any idea of the distance covered. This is especially true if there has been a good bombing fight. It is often advisable to have a crater at the end of the objective, as its lip will give cover for the withdrawal and it cannot be mistaken. Any enemy posts in the crater can be " shot up " before the operation with Stokes or 60-pound trench mortars. In special cases it is possible to select a piece of ground where an old trench, well out in No Man's Land, can be used for a " jumping off " trench. This is of secondary importance but still of some value.

3. Size and Selection of Parties.—The size of raiding parties vary from two men up to an entire brigade and must depend on the object to be attained

and the local conditions, but the average or every-day raid consists of about 130 men. This size raid covers about 600 yards and has strong artillery support.*

For about a year, from November, 1915, to November, 1916, the stealth raid was highly successful, but since the latter part of 1916, the enemy having recovered from his initial surprise, has adopted methods of defence that cause a large percentage of these raids to be a failure. A stealth raid is one made by small numbers without artillery support and relies on surprise for success. This was the form of raid the Germans usually used in 1917. It does not work against large numbers of auto rifles. This form of raid has been practically discarded now in favor of the raid by larger numbers supported by heavy artillery fire. There are some cases where a stealth raid can be used advantageously, such as the capture of an isolated post, but in the majority of cases they are a failure and result in heavy losses from machine-gun fire that has not been silenced by artillery.

In selecting men for a raid it is best to get volunteers if possible, but this is often impossible, as experienced soldiers do not as a rule volunteer. While perfectly willing to do anything they are ordered to do, they rightly do not care to look for trouble. The parties should be taken from all companies equally so as to divide losses and to foster a battalion spirit more than a company one. The men of each company should be assigned to the same sections though, so as to be fighting beside friends.

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* This size raid usually deals only with the enemy front line. Many raids take in second and third lines, but are really nothing but extensions of the example given later.

Very often the two battalions, of a brigade, in the line each furnish half of the party. This leads to division of losses, gives each battalion equal chances to distinguish itself and leads to better coöperation between the battalions of the brigade, which will be useful later in an offensive. They should not be considered as two separate raids and should be under the command of one officer agreed upon or selected by brigade. Only one set of operation orders should be drawn up or confusion will follow. As a rule a joint raid does not work as smoothly as a single battalion affair.

Great care must be taken in the selection of the officers and N. C. O.'s, as the success of the entire operation depends upon them directly. If the leaders show dash and no hesitation nothing can stop the men, while if hesitation is shown by the leaders the raid may break down at once. This is not caused by a lack of courage but by the confusion and demoralization caused by attacking at night, in small numbers, under a heavy artillery barrage. When available, officers of previous experience in the work should be used, though an officer should not be sent over more than twice a month, due to the strain produced by the responsibility, the hard training and the extra work of making the necessary patrols. Scout officers are valuable for this kind of work, as being used to dangerous night work they are more apt to keep cool at a critical time under conditions that are strange to many officers and men. If preparing a raid a scout officer cannot be expected to carry on with his regular work.

In picking the men never, if it can be avoided, take men who have not had previous experience under barrage. A barrage at night is a terrifying sight, and a new man is simply paralyzed for a few moments and usually unable to think or move. This feeling passes, but as dash is essential a man of this kind is worse than useless on his first trip. The best type of men are the old experienced bombers and ex-scouts.

(*b*) As soon as the party is picked it should be taken out of the line and excused from all duties except training for the raid. This work is usually done at the Transport Lines, where accommodations and rations can be procured. Absolute secrecy must be maintained and no civilians allowed to witness the training. Three or four days are ample for this work and more time simply gets on the men's nerves.

4. PATROLS.—Immediately after the selection of the point to be raided the battalion scouts make a thorough patrol of this section of the enemy lines. First they must ascertain, if possible, the positions of the enemy posts and machine-gun emplacements in the vicinity. Patrols have exposed themselves purposely to draw fire from these positions, or have thrown bombs into the enemy wire. Next they make a careful reconnaissance of the enemy's wire and report the results to the artillery. After that they select the best place for the assembly or " jumping off " position and the best posi-

tions for the covering parties. The patrol must make certain that there are no obstructions between the "jumping off" position and the enemy wire, such as, old trenches filled with water and wire, or old wire out in No Man's Land. After the wire cutting has commenced patrols examine and report the results every night. These reports must be extremely accurate, as the lives of the raiders are liable to depend on them directly. No effort, regardless of risk, must be spared and these reports should be considered final regardless of what the artillery officers say, or what the wire may look like through a telescope.

Just before the raid (2 hours) the scouts should cut gaps through our own wire. About six gaps per six hundred yards is sufficient. These gaps need only be about eight feet wide. After cutting the gaps a last reconnaissance of the enemy wire should be made to make certain that no wire has been put out at the last minute. Special attention should be paid to just in front of the enemy parapet, as the Germans have the habit of putting wire over the parapet at the last moment. This form of wire forms a nasty obstacle to pass through, as the raiders will be under a point blank fire the entire time.

At zero hour the scouts lead the raiders to the enemy trench as explained later.

Before the raid goes over, the entire party should be given the chance to go over the part of No Man's Land they will have to cross.

The officer in charge of the raid should make a personal investigation of the enemy wire and satisfy himself it is properly cut before he takes the party over.

5. Wire Cutting.—(*a*) *Artillery.*—The artillery should be notified three or four days before the raid, of the exact map locations of where they will have to cut gaps in the enemy wire. For a raid of about 130 men on a front of six hundred yards five gaps are sufficient. These gaps should be at least ten yards wide and clear of all wire. After breaking up the wire the gap can be swept clean with high explosive shrapnel. After finishing the gaps the artillery should continue a slow deliberate fire so as to prevent the enemy from repairing his wire. If the artillery cannot do this with ease a machine gun firing intermittent bursts will accomplish the object. The artillery should accept the word of the scouts as to the condition of the wire regardless of what the appearance of the gap, from a distance, may be. The guns should also work on several different points along the line so as to prevent the enemy from knowing exactly where the raid is to take place. As a rule, the 18-pounders (3″) and sometimes the 4½″ howitzers are the only guns used for wire cutting.

(*b*) *Trench Mortars.*—The trench mortars should assist the artillery in cutting wire. In fact the 60-pound trench mortar ("plum pudding") is the best wire cutter we have at present. Five of these trench mortars with the assistance of the artillery should be able to cut the five gaps in three days. The Stokes guns are of great assistance in cleaning out a gap or in breaking light wire, but are not of much use in breaking heavy wire or knife rests. This shell has little metal and must rely on the actual explosion for its destructive power. The heavier metalled 60-pound trench mortar is more efficient weight for weight.

6. BARRAGES (see Fig. 7).—(*a*) *Artillery.*—There are any number of schemes for box barrages, but as a description of more than one simply leads to confusion, only one example will be cited. This barrage has proved very satisfactory in every way. In this form of barrage the 18-pounder is the travelling portion. All other guns have the same target throughout.

(*a*) *18-Pounders.*—Zero means the moment that the infantry moves, and all time is figured from this moment. 0 — 7 means seven minutes *before* the infantry starts. 0 + 7, seven minutes *after* the infantry starts. At zero — 7 the entire barrage, with the exception of the machine guns, opens. The 18 (3″) pounders open with a rapid fire (4 rounds per gun per minute) along the entire front line to be raided. At 0 — 4 these guns lift to the support line (standing position). This is to lead the enemy in the front line to believe that the attack is coming and cause him to come out of his dugouts. At zero — 2 the barrage comes back to the front line and again drives the enemy into his dugouts. At zero the standing barrage is resumed, the infantry advance and the machine-gun barrage opens. This time the enemy will probably remain longer in his dugouts and if caught there by the infantry is helpless. For a raid of this size four, six-gun batteries of 18-pounders will be sufficient.

For this part of the barrage it is much better to use *percussion* high explosive shrapnel than air-burst shrapnel. This form of shell is much more demoralizing to the enemy, as by hugging the parapet there is little danger from air-burst shrapnel, while it is impossible to escape from a well-placed percussion shell. Another reason for using this form of shell is that it is much safer for the raiders. In using air-burst shrapnel, due to the high speed, a very slight variation in the fuse will cause the shell to burst over the raiders. One shell bursting amongst the party, before they start, would destroy all their dash and the raid might just as well not start. There is nothing that takes the spirit out of men more than to have casualties from their own guns, and this is practically so in a raid, due to being out with a small party at night. In a big attack, in daylight and with friends on both flanks as far as you can see, it does not seem so bad to have a short drop in your midst. The greater part of this danger is avoided by the use of percussion shells. With a percussion shrapnel barrage it is possible to get within forty yards of the enemy line before zero, while with an air-burst shrapnel barrage it is unsafe at a hundred yards. This is a very important point, as it is advisable to get into the enemy's lines as quickly as possible so as to prevent his machine guns from catching the party and also to catch the enemy in his dugouts. It is possible to get a little closer to percussion shrapnel than to a percussion shell, as the shrapnel has a more forward throw to the burst.

(*b*) *4.5″-Howitzers.*—These howitzers open fire at zero — 7 minutes, but do not change targets. They maintain a rapid fire on junctions of communication trenches and all trenches from the support to the reserve line, on machine-gun and trench-mortar emplacements, large dugouts and suspected headquarters. They help the 18-pounders to fill out the standing barrage on the support line.

It is difficult to say how many guns would be needed, as this varies with the number of targets. No suspected emplacement should be overlooked. As a rule, ten guns will be ample.

(*c*) *60-Pounders* (*Rifles*).—The 60-pound guns are used exclusively for counter-battery work and their number depends on the local artillery concentration. All the guns of this type available should be used.

(*d*) *6″ Rifles—8″ and 9.2″ Howitzers.*—These guns fire on all buildings, strong points, etc., where machine guns are suspected and on important back area cross roads, where some damage may be inflicted on any reserves being moved up. The number of these guns used depends on the number of targets, guns available and ammunition supply. Except for the destruction of dangerous buildings they are of not much real use to the raid itself.

(*b*) *Trench Mortars.*—(*a*) *Stokes Guns.*—The " Stokes " open a rapid fire at zero — 7 and form the ends of the box barrage. They establish blocks in the front line and communication trenches at the ends of the objective and about 75 yards away from the furthest point reached by the raiders. Two guns on each flank are sufficient.

In case the ground is such that the 18-pounders cannot fire accurately on the enemy front line, Stokes guns can put up a most effective and demoralizing barrage for the seven minutes before zero while the 18-pounders are firing on the support line. The barrage in this case would probably be continuous on the front line and not lift, until zero, when the Stokes would change targets and form the blocks as before. In this case about 1500 Stokes shells would be used during the operation.

(*b*) *60-Pound Trench Mortars.*—These trench mortars are used to bombard crater and machine-gun posts previous to zero. At zero they should cease fire unless they can lift to an emplacement or junction well back. These bombs are not suitable for a barrage that infantry has to get close to.

(*c*) *Heavy Trench Mortars* (*150 Pounds*).—These fire on any buildings or emplacements that are well on a flank. They should not be fired over the heads of the raiders, as they are often very erratic as to range.

(*c*) *Machine Guns.*—Machine guns play an important part in these barrages. They should fire from each flank if possible, putting up a double or triple barrage that crosses behind the objective and as close to the objective as possible. This barrage prevents all movement across the open while the artillery and Stokes prevent any along the trenches. It is very important that no machine guns start firing before zero, as they are a certain indication that infantry action is going to take place. As many as fifty guns have been used to great advantage.

(*d*) *Auto Rifles.*—Two auto rifles per company front, for 1000 yards on each flank, should keep up a sweeping fire along the enemy parapet to prevent the front line from giving the raiders an enfilade rifle fire. For the same reason as for machine guns, these guns should remain silent until zero.

With such a barrage as this there should be absolutely no rifle or machine-gun fire and very little artillery fire turned on the raiders. *The object of the barrage is to absolutely smother all opposition except from the enemy actually in the objective, and they should be well shaken up.* The organized work of the raiders should readily overcome this resistance and, as our barrage prevents escape, either kill or capture the entire garrison.

The time that the party is actually in the enemy trenches is usually about one-half hour. After this time, say 0 + 35, the barrage slowly begins to die down until at about 0 + 55 it has ceased. Machine-gun and trench-mortar fire can cease at 0 + 35, as there is no more need of them and trench-mortar ammunition is hard to get up to the emplacement.

7. TRAINING.—As soon as the party is back at the transport line their training should commence. A set of trenches (1 foot deep is enough) should be dug exactly like the enemy line and to the same scale. Extra trenches should be put in so that enemy air craft can

not recognize the set of trenches dug. These dummies must be marked and explained to the men. A trench should be dug also to represent our front line or the "jumping off" trench, if there is one. The parties should then have explained to them exactly what their duties are and then practise the raid time after time until every man becomes perfect. The barrages can be represented by men with flags. All kinds of opposition should be represented and then men shown what to do in any contingency. The men should be especially instructed in how to reform on the enemy parapet if wire is unexpectedly run into and confusion thus caused. While this reorganization is being carried on by the non-commissioned officers, men who have been previously detailed should take up positions to cover the remainder from attack. During the training the men should receive instruction in throwing live bombs at night. They should throw enough to become absolutely familiar with them and have confidence in their ability to throw straight.

In the very beginning the men are divided into the several small sections they will work in. Friends should be allowed to work together if possible. The commanders of these groups are selected and a definite chain of command established throughout, so that no matter who is a casualty there will be a man to take his place.

Under different conditions there are different ways of dividing the party, but the following is one that is highly successful and allows rapid movement down the enemy trench without excessive exposure:

Assume that the following party is going over:

4	Officers
18	Non-commissioned Officers
106	Privates
10	Scouts
6	Auto Riflemen
8	Stretcher Bearers
152	Total

and that the objective is something like that shown in Fig. 6.

In this case the entire party might be divided into six sub-parties, A, B, C, D, X, Y.

A, B, C and D would be actual raiding parties and each consist of:

1	Officer
4	Non-commissioned Officers
22	Privates
2	Stretcher Bearers
2	Scouts
31	Total

and parties X and Y would be covering parties, each consisting of:

1	Non-commissioned Officer
3	Auto Riflemen and Gun
9	Privates (mostly bombers)
1	Scout
14	Total

Party A enters gap 2, turns to *right* and comes out gap 1.

Party B enters gap 3, turns to *right* and comes out gap 2.

Party C enters gap 3, turns to *left* and comes out gap 4.

Party D enters gap 4, turns to *left* and comes out gap 5.

Parties X and Y take up selected positions on the flanks as covering parties.

The objects of sending over so many parties are:

1. In the same time they cover four times the ground one can.
2. Each party covers the other to some extent.
3. Much greater morale effect on the enemy.
4. Practically four raids with one barrage.

The reasons for the parties entering and leaving as they do are:

1. No two parties are working towards each other and therefore the chance of two parties bombing each other is eliminated.
2. Decreases the number of gaps necessary.
3. No congestion in "No Man's Land" or in our own line upon the return.

Each of the parties A, B, C and D are further divided into five sections, called sections 1, 2, 3, 4 and 5 and made up as follows:

No. 1 Sec.:	1 N. C. O.	No. 2 Sec.:	1 N. C. O.
	6 Total		5 Privates
	—		—
	5 Privates		6 Total

No. 3 Sec.: 1 N. C. O.
4 Privates
5 Total

No. 4 Sec.: 0 N. C. O.
4 Privates
4 Total

No. 5 Sec.: 1 N. C. O.
4 Privates
5 Total

8. Duties of Sections.—*1 Section.*—This is a bombing section and advances down the enemy parapet fully twenty yards ahead of every one else. This is the most important section and should be made up of the best men available. The noncommissioned officer must be a man of proved dash and initiative. When advancing down the parapet this section moves as fast as possible, but is careful not to lose touch with 2 Section or to leave any enemy behind them in the trench. Its function is that of an advance guard for the rest of the party, who know that they can advance around the traverses without bombing and thus save time and bombs. 1 Section continues to advance until it meets with resistance that it cannot readily overcome when it either holds its ground until 2 Section comes up or falls back until abreast of 2 Section, when both advance together. The last man of the Section is responsible that the proper distance is maintained and that signals from the officer are obeyed. Usually, enough lights are up so that arm signals can be seen, though of course verbal commands are impossible. The Section led by the N C. O. usually advances in file. If

any temporary blocks are needed they are put up by 2 Section and covered by 1 Section.*

2 Section enters the enemy trench and follows 1 Section as fast as possible until resistance is met, when it will help 1 Section to overcome it. They advance as a bombing section with a bayonet man in front, followed by the thrower and carriers. They keep a sharp lookout for dugouts and when they find one signal 1 Section to halt and then guard the entrance, endeavoring to get out prisoners, until 3 Section arrives, when they will move on again. If a machine gun is found, after disposing of the crew it is left for 4 Section. Any prisoners captured by this section are passed back through 3 and 4 Sections to 5 Section. If any enemy wounded are found they should be bayonetted if sufficient prisoners have been taken (say 3). No live enemy should be left lying in the trench behind the party, as wounded Germans, who are spared, have the habit of shooting our men in the back. There are usually bombs and casualties' rifles lying around so that it does no good to disarm them. Our men can't be bothered carrying wounded Germans around and be-

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*When advancing down the parapet the leading man is the N.C.O.; the remainder are in the following order: Thrower, Bayonetman, Thrower, Bayonetman, connecting file. On approaching a bay the throwers jump upon the parapet and look in. If they see a German they throw in a bomb and spring back. They are now covered by the bayonet men, who stand ready to fire at any enemy who endeavor to stick their heads up to fire. This operation sounds more dangerous than it really is, if the bombers move quickly.

sides, a raid is supposed to be a merciless affair, and all enemy encountered after two or three prisoners are taken should be killed. One of the main reasons why Canadian raids are so successful is that the Germans know that they get no mercy and often lose their nerve and try to get away. Raids often receive orders to bring back only three prisoners.

The officer is usually on the parapet opposite the leading man of 2 Section. He can best control both the fighting sections from this position—the leading section by arm signals and the other by voice.

If any communication trenches have to be passed it is necessary to have a party of say 3 bombers detailed to form a block. This block should be about 30 yards down the communication trench and is made with any material at hand. It need only be of the slightest impediment to enable the bombers to hold it a few minutes. A small prepared barbed-wire obstacle may be carried over for this purpose. The bombers hold until the recall signal and prevent any enemy from getting into the trench behind our raiding party, where they would interfere, at the very least, with our evacuation of wounded and prisoners.

3 *Section* is equipped with mobile charges and is responsible for the destruction of the dugouts. These charges are made up in 10-, 20-, and 40-pound tins of ammonal. The 10-pound tin is sufficient for all ordinary work, though if a mine sap is expected a 40-pound cylinder should be taken over. The charge should have a friction lighter and *not* the Noble

lighter. These Noble lighters have often failed when needed; if they have not dropped off before that time. This section follows closely on the heels of 2 Section and as soon as a dugout is turned over to them get out what prisoners they can at once (if none have already been taken) and then roll a charge down each entrance. The 10-pound charge will completely destroy the dugout and any enemy in it. A six-second fuse is sufficient.

4 *Section* is equipped with slabs of gun-cotton for blowing the chains off of any machine gun that happens to be chained to its emplacement. They carry the machine gun back to our lines. Each slab weighs 1/3 pound and has tapes fixed on so as to facilitate tying them to the chains. As the gun cotton is a very light load these men can carry extra bombs for the bombing sections. If 5 Section is not sufficient for the purpose 4 helps to escort prisoners and wounded back to our lines.

5 *Section* is a general utility section. They escort prisoners and wounded back, and are responsible that *all* our dead are taken out. None of our men, dead or alive, must be left in the enemy lines. This is not a matter of sentiment but of necessity, for no matter how careful the Commander may be there may be some form of identification on a body. A pencil mark on a piece of clothing showing what battalion a man belongs to is just as good as a sign board and gives the enemy information that it would take a successful raid to obtain. 5 Section thus relieves the fighting

parties of the necessity of stopping and encumbering themselves with their casualties. When a man drops he is left where he falls until 5 Section comes along.* One or two men of this section carry sandbags to collect enemy equipment, documents, etc. When a German body is found *all* articles are removed. His shoulder straps and identity disc especially should be taken. Most Germans have a pocket in the tail of their coats where they carry all their documents. Any arms that cannot be carried away should either be destroyed or thrown well out into No Man's Land.

Scouts.—The scouts make a final reconnaissance of the enemy wire and then cut gaps in our own wire and lay tapes from our parapet to our gaps. About half an hour before zero the scouts lead our parties to the "jumping off" position and then lay tapes from our gaps to the enemy gaps. At zero they lead the parties to the enemy gaps and wait there to assist the stretcher-bearers and guide back the parties coming out. At zero two scouts and two stretcher-bearers proceed to gaps 1 and 5, laying tapes as they go, and remain there until our party comes out. They should warn the party of the gap if it is going too far. One scout conducts each covering party to its position at zero. After the raid all tapes should be brought back by the scouts and the gaps in our wire repaired as soon as things quiet down. The white tapes about 1 inch wide are put out to act as guides. If you are on a tape and don't know which direction to follow it our barrage fire should be a good enough guide.

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* No matter how badly the man may be torn to pieces he should be gotten away in a sandbag or some other way. If very badly torn up the remains may be put in a shell hole out in No Man's Land and covered with mud.

Covering Parties X and Y.—These parties, with their auto rifles, move out at zero to the positions selected for them. They usually form a line half facing the flank and get into shell holes with the gun in the centre and bombers on each side. Their duty is to prevent any enemy from attacking the raiders from No Man's Land and also to cover the withdrawal. They are the last parties to withdraw.

During the training the party is divided up as above and every man made thoroughly acquainted with the duties of his and every other section.

As soon as possible Operation Orders are issued and these orders are read to the men and every detail explained to them. These orders are gone over and checked by the Brigade Staff, the Artillery, Trench-Mortar, Machine-Gun and Infantry Commanders, and all questions settled, there at Brigade, by the General.

9. EQUIPMENT.—All ranks wear steel helmets, and carry rifles and bayonets, except the scouts and stretcher-bearers, who carry no rifles or bayonets, the scouts carrying revolvers instead.

Web equipment is not worn.

Gas helmets are not worn.

One bandolero of small arms ammunition is carried.

Eight Mills bombs are carried by each man in Sections 1, 2 and 4.

Six Mills bombs by remainder of party, including covering party.

One field dressing per man.

Bomb *throwers* do not fix bayonets.

Bombs are carried in the haversack.

If possible "sawed off" rifles, with bayonet studs, are used, as they make a very handy trench weapon and fire accurately enough for the close-range shooting in a bay. These rifles are sawed off at the lower band.

Absolutely no forms of identification are carried by officers or men. The following articles are particularly looked after:

Identity Discs
Cap Badges
Shoulder Badges
Regimental Buttons
Numerals
Sleeve Patches
Pay-books
Letters, Roll-books, etc.

No clothing or equipment should have any regimental insignia marked on it by the man or laundry.

All men should understand that if captured they are not required to give any information except rank, name and number and that any other information will endanger the lives of their comrades.

Officers and N. C. O.'s should carry watches and flashlights. Two ground flares per officer and N. C. O. should be carried for a recall signal.

10. Time.—The time set for zero depends upon a number of points:

(1) *The Moon.*—It is not desirable to work under a bright moon, as the party may be seen taking up its position, which would be fatal. A bright moon also

makes it difficult for the scouts to work properly.

(2) *Season of Year.*—Care must be taken that daylight does not break before the parties return or that there is no snow on the ground.

(3) *Artillery.*—Often zero has to be arranged to suit the artillery, who have a large number of prearranged shoots, especially just before a big operation.

(4) *Attitude of Enemy.*—It is often possible to pick the time of night when the enemy is quietest.

A daylight raid has many advantages over one made at night, but is liable to more casualties and needs a smoke screen, still it is usually the most efficient.

All watches must be synchronized at least five times during the twenty-four hours previous to the raid. The last check should be about one hour before zero. *All* arms must check on same watch.

The usual time for zero is from 2 A.M. to daybreak.

The entire party must be formed up on zero night, so as to be in position at least twenty minutes before the barrage opens. Plenty of time must be allowed for the issuing of bombs and ammunition, for this is liable to take two hours if done in a trench. Time must also be allowed for the delay caused by meeting stretcher-cases, etc., in a narrow trench. Of course, the party have right of way, since it is taking part in an operation, but it is often hard to get the casualty over the top of the trench if it is muddy and high. No matter how badly hit, if time presses, the casualty must be gotten out of the trench.

When forming up in the communication trench care must be taken to have the parties and sections in the proper order. The officer must plan out the formation in No Man's Land, so that when the different parties start off 1 Section will be leading. This seems a small point, but one often forgotten, and the direct cause of confusion that has resulted in failure. The parties must be in line when in No Man's Land, for file is too long and at zero they must form file to get through the gap. Sketch "F" shows the proper order of sections when waiting for the barrage to lift.

11. APPROACH.—On approaching the enemy lines the officer leads with the scouts. It is best to walk or at most move at a slow trot. Just before reaching the parapet it is advisable to throw a bomb into the bay, for if it is occupied the officer will certainly be killed as he steps up onto the parapet. Care must be taken not to get up on the parapet until the bomb has exploded.

If wire is unexpectedly encountered the first men through should form a covering party for the remainder who should then follow as best they can. It is now up to the officer to straighten out his sections which will have become confused. It is necessary that he keeps cool and shows no signs of nervousness, or his party is lost. Post the N. C. O.'s where they can be seen and have the men fall in on them and then start ahead. The men must be told that if wire is encountered that they are to endeavor to *force* their way through and not hesitate on the outside. The closer they get to the enemy the safer they are from his artillery, machine-gun and bomb fire. A blouse, sandbag, or trench coat thrown over the wire is often a great help.

12. ACTION IN ENEMY LINES.—After entering the enemy lines there should be no loitering or the enemy will have time to escape or form up a defense; but this does not mean to rush the work and do it improperly. By not loitering is meant not wasting time coaxing enemy out of dugouts and not being excessively cautious in moving forward. Dash is what counts and not caution. If a large party of enemy cry out from another bay that they will surrender, make them come to you, fast, and do not go around to them or you will very likely be shot. If a German is kneeling in front of a dugout entrance with his hands up, be careful that there is not another kneeling on the steps aiming at you under first one's arms. If a German is met do not stop to order him to put up his hands, if they are not already up, fire or lunge at once, for he has the same chance to kill you that you have to kill him.

13. RETURN.—When each party is finished it gets home as best it can. At the expiration of the time limit the officer in command of the raid fires a ground flare on the enemy parapet as a recall signal. Men in other parties with flares should fire one per party and then each man is for himself and gets back as best he can. These signals are to warn any men who have gotten up communication trenches or are still performing some work. As a rule the parties are through well before this and get out more or less in sections.

The ground flare is practically the only recall signal that will work. No noises can be heard, not even gas horns in No Man's Land, and rockets from our line are never noticed with so many lights up. A ground flare cannot be missed or mistaken.

If there is an intense artillery or machine-gun barrage on our front line it is wise to stop out in No Man's Land until it is over. Sentinels are posted and everyone takes cover. After things are quieted down the men can go in, in small numbers, and proceed to the assembly point well in rear. They should not be allowed to stop on the way to discuss the operation, for this blocks the trenches, increases the chances of casualties and prevents wounded, etc., going out. In most raids the heaviest losses are sustained on our parapet during return.

14. Evacuation of Wounded and Prisoners.—Operation orders should provide for guides in the front line and at trench junctions to show wounded to the dressing station and escort prisoners to the Headquarters. Two ambulances should be brought up as close as possible beforehand.

15. Reports.—There should be an advanced Headquarters in the front line and it should be in telephone communication with battalion and brigade headquarters and the artillery, trench mortars and machine guns. Battalion and brigade should be kept informed by code of the action as it progresses. As soon as a prisoner is taken his regiment must be *wired* to Brigade.

In order to keep open the wires it is necessary to lay four or five lines by different routes to each of the several headquarters. On the day following a full written report, with recommendations, should be submitted.

CHAPTER III

PATROLS AND THE CONTROL OF NO MAN'S LAND

1. There should be drawn a more or less arbitrary line between observation and reconnaissance. Both duties are performed by the battalion Intelligence Sections, but by entirely different sets of men.

By observation is meant the method of obtaining data from stationary observation posts, while by reconnaissance is meant the method of obtaining data by means of patrols.

2. At the very outset it is necessary to point out the vital importance of this work. Even the highest authorities have no means of obtaining information about the enemy's front line except through our own front line troops. Without accurate information it is practically impossible to plan any operation.

A great deal of very valuable information goes to waste simply because the ordinary man in the line does not know what to do with it, or is too lazy to tell what he has seen or heard. For instance, a sentry, at night, may distinctly see the flash of an enemy trench mortar or machine gun. If he at once notifies his officer and this officer passes it on to the Intelligence Officer there is every chance that the enemy gun will be quickly located and put out of action. In all cases the correct procedure is to get the information to the Intelligence Officer at once. He will know the best use to make of it.

3. The organization of the Intelligence Section varies in different British battalions; but the following is one that has proved successful:

1	Intelligence Officer (O. C.)
1	Scout Officer
1	Sergeant (Scout)
1	Corporal (Observer)
1	Corporal (Sniper)
2	L/Cpls. (Scouts)
4	Snipers
12	Scouts
10	Observers
1	Cook
1	Servant
35	Total All Ranks

4. Under the heading of patrols the only parts of the above dealt with are the Scout Officer, Scout Sgt., two L/Cpls. and the 12 Scouts. These men are divided into two reliefs of eight men each. One is commanded by the officer and one by the sergeant. This number is ample for all ordinary purposes. It can handle any ordinary German patrol of from twelve to fifteen men, due to the better morale, training and bombs possessed by our men. A larger patrol than this is difficult to conceal properly and can not get close to the enemy without being seen.

If for any reason, such as offensive work, a larger patrol is needed, the two reliefs can be joined or bombers borrowed from the companies.

In order that these men shall be properly trained they should be excused from all duties except those actually pertaining to their work. For training and discipline they should be under the direct command of the Scout Officer.

During training special attention must be paid to the following subjects: Night firing with revolver and bomb, map reading, use of prismatic compass and the perfection of patrol formations and signals. Besides the above they should be trained in reporting what they have observed. It must be impressed on all that it is far better to be not able to report anything at all than to give information that is not absolutely accurate.

5. Upon entering a new sector it is imperative that the Scout Officer, after a careful study of his ordnance map and air photographs, decide on a definite plan for his patrols to work upon. The plan should be so devised that a thorough map of No Man's Land can be drawn up. Only too often patrols are sent out on the spur of the moment with only a hazy idea of where they are going or what to look for. As a result they see so many things, that, not having definite orders to pay particular attention to certain features, their report is as hazy as their impressions, and of no value whatever.

At present there is a real need in France of maps of No Man's Land. Each battalion gets, in time, a fairly accurate idea of local conditions, but this information is not put down in map form and is carried away in the heads of the battalion being relieved. As a result each battalion is forced to duplicate work already done, any number of times before, and has not time to really do the work properly. If each scout officer would put on a map, specially constructed for the purpose (scale 1/2,500) all information he gathers, with the date, progressive work could be done and in a very few weeks accurate maps could be obtained of all the No Man's Land in France. A log book should be kept in which is entered the date of any information and the circumstances connected with the obtaining of the data. From this its reliability can be ascertained at any time.

The following is a scheme worked out and found satisfactory as far as the limited time of a single tour, say seven days, would allow. The work to be done was roughly divided into three parts:

(*a*) Our own front line, support lines, and communication trenches.

(*b*) Our front line parapet, wire, and No Man's Land as far as the enemy wire.

(*c*) The enemy wire, location of his saps, bombing and listening posts, etc.

The first thing to be done was to prepare a large piece of tracing paper by drawing in the map squares to a scale of 1/2,500 (about 2 feet to the mile). Then, after studying the ordnance map and air photographs, a certain amount of time was allotted to each of the above divisions, according to the difficulty of the work in each case.

Under ordinary conditions it worked out about as follows:

6. During the first and second days three observers make a detailed map of our lines as far back as battalion headquarters. During this time the battalion has the use of observers from the outgoing battalion, as explained under partial reliefs, and therefore has some spare men. During the same time all scouts make a complete tour of all our lines and study the observers' maps. This is necessary, as the scouts are guides for the battalion and visiting staff officers.

The scout officer compares the observers' maps with the latest ordnance maps and notes any differences, of which after personal investigation, he notifies brigade. It often happens that the ordnance maps are wrong or that new work has been done since they were printed.

7. First Night.—On the first night, in a new sector, the scouts go no further out than our own wire, and working from one flank make a thorough investigation of our wire, front line parapet and prominent objects in the back country. This may appear trivial work, but it is of great importance in the work to be done later. Before a patrol can go into the enemy wire it must know all the gaps in our wire for purposes of exit or entry; must be able to recognize prominent features in our parapet and back area so as to be able to locate themselves, by bearings, when out in No Man's Land. It does no good for a patrol to locate a gap in the enemy wire or a post if it does not know where it is itself. Unless exact map locations, of

points seen on patrol, can be given, the information is of little or no value. If a patrol knows all the marks in our parapet (usually a sky line) such as, piles of sandbags from a mine sap, high points in the parapet, isolated wooden posts, etc., or knows the outlines of buildings, mine shafts, haystacks, hills, clumps of trees, etc., in the back country, it can take bearings on two or more of these, and these bearings when plotted will show exactly where the patrol was at the time. This is the reason for spending the first night close to our front line. Besides this, an accurate report of our own wire is always very welcome at battalion headquarters, as it will show where work is most urgently needed.

Company commanders often complain that this close patrol is of no protection to the line and this brings up a much discussed question as to whether a patrol is responsible for the defence of the line or not. This question was finally settled by Gen. Sir Julien Byng, when he very definitely stated, to a meeting of all the Intelligence Officers of the Canadian Corps, that battalion scouts were to be used for obtaining information *only,* and that the company commanders were responsible for the protection of their own frontage.

Another objection company commanders raise is that the patrol masks the fire from the trench. This is true, but can be reduced to a minimum by having a scout stay on the parapet exactly abreast of the patrol. He shows where the patrol is at the time and other parts of the line are at liberty to fire. The patrol itself can defend the point it is on if necessary.

When working down our wire it is necessary to have a flanking party, of say three men, about twenty-five yards out in No Man's Land to prevent surprise.

8. Second Night.—On the second night the patrols examine all mine craters and determine the following points:

1. Whether occupied by enemy
2. If so, strength and location of post.
3. State of wire protection.
4. Whether it would be practical to raid the post.
5. Height of crater lip.
6. Size of crater, depth and diameter.
7. Condition of interior with view to use as an assembly post for a raid or general attack.
8. Whether it would be practical to place a post of our own on the near lip.

It is a very difficult and dangerous piece of work to investigate a mine crater and it is hard to say what is the best way of doing it. It is usually impossible to crawl right around the lip as it is a sky line. Besides enemy parties manning a crater sap are usually very wide awake. About the only way to approach is from the rear; but enough to one flank to keep away from a sap running from the crater to the enemy front line. These saps are often manned by connecting files and if seen the patrol will get fire and bombs from three sides at once. The patrol should start well out to one flank and cross No Man's Land until very near enemy wire, and then work along the wire towards the crater, until within about twenty yards of where the sap should be.

From this point head straight towards the crater. The advantage of approaching from this direction lies in the fact that the crater party will be looking in the opposite direction, and that if seen from the front line they will hesitate to use a machine gun for fear of hitting their men in the crater, or they may think what they saw was their own post. It is very likely that there will be no post in the front line directly behind the crater post, as this would put too many men on this piece of front and a unit usually has all it can do to man its length of line without putting two posts, one behind the other.

Upon getting to within about thirty yards of the crater the patrol should be placed in shell holes and only the officer and L/Cpl. advance. Two men can go much closer than an entire patrol. When as close as they can get with safety these two men get into a shell hole and wait for a flare to go up. What constitutes a safe distance can only be determined by experience and depends on the enemy's vigilance, the night, the nature of the ground, etc. Sometimes it is possible to approach to within five yards, and sometimes a bomb is thrown when the patrol is thirty yards away. If once seen and bombed, go back if possible, for it is useless to try to approach for hours, if at all that night.

When the flare goes up and it is possible to observe the crater, great care must be used. The flare lights up the observer as well as the enemy. In order to observe from a shell hole take off the cap and place one cheek on the ground and observe with one eye. This breaks the outline of the head and shoulders, which is what the enemy is looking for, and can see for quite a distance. It is surprising how much closer it is possible to get if no definite outline is shown.

If no enemy post can be seen bring up the remainder of the patrol and with the officer well in the lead, say ten yards, start making a circuit of the crater. Care must be taken not to show on the lip, which is usually a sky line. It is better to keep well away from the crater so as to be certain to be off the lip. The officer can crawl to the edge when necessary to observe the inside, though that can be done best from our own side. When moving, the leader should advance one shell hole and then each of the remainder advance one. After each move quite a pause must be made in order to be certain that no enemy is around and also to allay suspicion if the last move was uncertainly detected. By quite a pause is meant, say two or three minutes. There is always plenty of time and such matters cannot be hurried without detection.

Each crater must be treated in the same manner and the results put on the map being made.

When a number of craters are joined together and are close to the enemy's line it is practically impossible to get any information about their far lip. They have to be considered as part of his front line and the only indication as to whether they are held or not is to be obtained from air photos, which would show a sap leading to the crater, though that is no certain sign that the lip is manned. Another sign is the firing of flares from the lip and is a better indication than the air photo.

9. THIRD NIGHT.—During the third night the patrols examine all trenches running across No Man's Land. The points to be observed are:

1. Whether trench is passable for our own or enemy raiding parties.
2. Its direction, point of entry into our lines and enemy's, if possible.
3. Its branches.
4. Whether it is occupied by enemy outside his own wire.
5. Whether it or its branches are fit to be used for an assembly trench for a raid or general attack.
6. Whether or not it is full of old wire or water and would form an obstacle for our own or enemy attacking forces. Attacks have failed because they have unexpectedly run into such trenches. No Man's Land is apt to contain a regular network of old trenches and be filled with the remains of old barbed wire. In a battle sector the fighting has gone back and forth over this ground a number of times and each time a new set of trenches has probably been put in. These trenches are in all stages of decay. Some have fallen in, some are in fairly good repair. Whatever their condition, this condition should be accurately known.

This information is also put on the scout officer's map, which is now beginning to be of some value, and even if carried no further would save the next battalion a great deal of time and labor.

In following a trench of this kind it is usually best to place half the patrol on each side with one man actually in the trench. If the trench cannot be readily crossed it is better to keep the entire patrol on one side except for the one man in the trench. The officer should be well ahead as usual. This is comparatively easy and safe work, as cover is always handy, and no enemy likely to be met, except from the front.

10. REMAINDER OF THE TOUR.—The remainder of the tour is spent investigating the enemy wire. This should be done in a systematic manner, working steadily from one or both flanks inward. It is best to work from both flanks with one flank assigned to each relief, as each relief will then do a continuous piece of work and will not be starting where the previous relief left off. The starting point should be determined by means of a compass bearing (see chapter on "Use of Prismatic Compass") from some sap head; in our line, that is shown on the ordnance map. This bearing is measured on the map and then the patrol crawl on it from the sap and can strike the desired point within a few yards. On returning the stopping point should be located, when possible, by bearings on prominent objects in our back area or the enemy back area. As soon as the patrol returns its leader must report to the scout officer, who will put the information on his map.

11. WIRE REPORTS.—When reporting on wire the following points should be observed:

1. *Strength.*
    - (*a*) Height.
    - (*b*) Depth.
    - (*c*) Thickness or density.
    - (*d*) Number of lanes of wire.
2. *Position.*
    - (*a*) Of inner lane from enemy front line.
    - (*b*) Distance between lanes.
    - (*c*) Map location of portion examined.
3. *Gaps.*
    - (*a*) Map location.
    - (*b*) Width.
    - (*c*) Whether straight or zig-zag.
        - (*a*) Whether left purposely for enemy patrols to emerge from, or cut by our gun fire.
    - (*d*) Whether it is clean or just weak spot with some wire left.
    - (*e*) Accurate report of effect of our recent gun or trench-mortar fire.
4. *Composition.*
    - (*a*) Knife rests (metal or wood).
    - (*b*) Apron wire.
    - (*c*) Loose wire.
    - (*d*) French or barbed.
    - (*e*) Whether wooden or metal screw stakes are used.
5. *New Work.*
    - (*a*) Position.
    - (*b*) Extent.

(*c*) Probable time since put in.

(*d*) Whether it is likely the enemy will continue work and our artillery and trench mortars can catch them. Material left lying on the ground is a good indication the enemy will work there the next night.

Under ordinary circumstances it is best for two men to actually investigate the wire, while the remainder move along abreast of them and about 15 yards out. One man should never go alone, for a stray shot might knock him unconscious and the remainder of the patrol not know it and lose his body.

When investigating a gap cut for a raid it is imperative that the scout officer, and usually the officer taking over the raid, go *completely* through this gap, being certain that they have passed all wire and that no obstacle remains between them and the enemy front line. There is often a row of wire just a few feet from the parapet and it must be ascertained, so that not the slightest doubt remains, that this has been cut. The lives of the men going over hang on the absolute accuracy of the scout officer's report and on this occasion no risks are too great for him to take until he is completely satisfied. He should observe the width of the gap and whether the gap is filled with piles of broken wire or has been swept clean by our high-explosive shrapnel.

If, when moving down the wire, an enemy advanced post is located a wide detour out into No Man's Land must be made in order to avoid it. After all the information necessary has been obtained these advanced posts should be driven in.

If all the information secured thus far supplemented by that gained by the observers during the day, has been put on the map a very valuable document has been built up that can be given to the relieving battalion, who can work at putting in details left out during the first tour.

If time permits all enemy advanced posts should be located and, if possible, driven in. The patrol can crawl up to within bomb range, say twenty to twenty-five yards, and then let an unexpected volley of bombs fall into the post. In order not to let the post know from what direction the bombs are thrown it is a good idea to remove the handle from the Mills bomb before throwing and smother the slight " click " in your hands. The bomb is then thrown as quickly as possible, as of course the fuse is burning. Not being able to tell where the bombs are coming from the enemy will probably throw their bombs way over the heads of the patrol, if they throw in that direction at all. The remainder of the enemy post will soon run for their trench. In the same way all posts are driven out of No Man's Land. This is not as dangerous as it sounds, and except for bad luck there should be no casualties in the patrol.

12. GENERAL REMARKS.—It is often a great help, when investigating enemy wire, to post a man in our front line, opposite the point where our patrol is working, with instructions to fire 1½" "Very" lights at

fixed times, say every five minutes after the first forty-five minutes. During this first three-quarters of an hour no lights should be fired, as the patrol is getting into position to observe. When the time comes for the flare to be fired the entire patrol must be in shell holes and no one allowed to look out except the officer and N. C. O. One should look to the right and one to the left and conceal themselves as described under crater investigation. It is necessary that the officer's watch and that of the man firing the flares should be exactly the same and that an understanding be reached that if the first flare fails to light a second or third be fired at once, the time for the next being reckoned as if the first had not failed. The light must be fired high and go over the heads of the patrol. On no account must it fall behind them, as this would throw them into relief and be fatal. A light dropping just in front of the enemy front line blinds him and shows up the wire, very plainly, to the patrol. If the light goes over the enemy trench it does not blind him, but still shows up the wire during its fall. The best time to observe is while the light is still in the air and before it has passed over the enemy front line. During this time it is shining in the faces of the enemy and from behind the patrol, whose eyes are not blinded. After it has struck the ground it often shows up the heads of the enemy sentinels and some idea of how he holds his line may be determined. These lights are of great assistance, but are dangerous, and can only be used after making certain that the man doing the firing knows his instructions. While the patrol is out no other flares must be fired anywhere near where they are working or any at all if it can possibly be helped. Usually the most dangerous kind of a flare is one fired away off to one flank, maybe half a mile away. Always lie quiet when a flare goes up, no matter how far away it is.

Warning.—Although patrols are more or less independent, there must always be perfect coöperation between them, the infantry and the artillery.

Every afternoon the scout officer should make it a point to see the battalion and all company commanders to determine whether they desire anything particular done, and if not, to tell them what are the plans for the patrol during the night. If the companies are going to send out wiring parties they have a right to expect that the scout officer furnishes leaders for the covering parties. No matter what kind of work the companies intend to do in front of the parapet the scout officer *must* be notified beforehand. He is absolute commanding officer of No Man's Land and no man, from the battalion commander down, has the right to step over the parapet without notifying him. One man must be in charge of No Man's Land and the scout officer is the logical man for the position. If any officer can go roaming around our wire he will be killed sooner or later by our own patrols or kill some of the patrol. A large number of casualties have been caused in this manner, for a man out in No Man's Land cannot stop to ask questions, and if anyone is seen when no warning has been given, he is presumably an enemy. Conversely, it is just as important that the scout officer notify all parties concerned before any of his men go out.

It is not sufficient to simply notify the company commanders in the afternoon that a patrol is going out. *Every* man on the front affected, the battalion on the flank, trench-mortar people and the artillery liaison officer must be given the following facts:

EXTREMELY IMPORTANT
(*a*) Time of departure.
(*b*) Place of departure.
(*c*) Size of patrol.
(*d*) Ground to be covered.
(*e*) Time of return.
(*f*) Place of return.
(*g*) *Name of officer* sending warning.

Every man should be told the above by some member of the patrol. Usually the officer goes in one direction and the N. C. O. in the other. Not only the sentinels are to be told, but their reliefs also. The officer on trench duty should be present to see that no saps or listening posts are omitted. The warning must *never* be *passed* down the trench, as this is a certain way to make mistakes. Upon return the trench must be notified of the fact. Every man in the battalion should be told that, if he sees *one* man coming in from No Man's Land with his hands up, he is *not* to fire. One man in the open cannot harm a sentry post in a trench, which has him covered. If it is a German he is lost or a deserter and will make a valuable prisoner. If it is one of our men of course he shouldn't be shot. If for any reason a patrol is lost or has to come in before time the officer can come in this way and satisfy the sentry post and then go out and get his patrol. *All* men must know this and the scout officer must see that they do. It is too late to teach the battalion when you are out and have to get in.

Before going out the artillery, machine guns, and trench mortars must be notified not to fire on a certain front during the time the patrol is there, except, of course, in cases of emergency, when the patrol must be sacrificed.

Whenever possible the scout officer should arrange to take out as many officers and men of the battalion as practicable, so as to give them some experience in No Man's Land. The confidence thus gained comes in very useful when the men are sent out on wiring parties or when they " go over the top " in an offensive.

Company Patrols vs. Listening Posts.—There is much divergence of opinion amongst different staffs, on the use of company patrols for the defence of the front line, but very little amongst line officers, who do not want them. Still it is very common to receive orders to keep them out all night, with the result that the line is in serious danger.

These patrols are supposed to move up and down the outer side of our wire and protect our line from sudden raids, without artillery preparation. Of course if there is artillery fire that is all the warning necessary.

These patrols are both useless and a menace to the line. There are a number of reasons for the above statement. A man moving in No Man's Land can do no observing, all his attention must be concentrated on picking his way and keeping quiet. An untrained body of men, blundering along, can be heard for a long distance and any enemy party that is out would simply lie quiet in shell holes until they have passed and then either enter the trench or take up positions and destroy the patrol on its return. The only time this patrol is doing any good is when lying still, in shell holes, and to all intents and purposes acting as a listening post. Besides being useless these patrols are a menace, as they mask the fire of the trench and cause uncertainty on the part of sentinels. The sentinels are never certain whether a body of men is their patrol or an enemy raiding party. In one brigade, enemy raiding parties got into the front line and secured prisoners on two nights running. In both cases they were plainly seen but, due to uncertainty as to identity, were not fired upon. In one case the raid occurred between two Lewis guns which were both trained on the party and neither were fired. As a result the brigade staff ordered double the number of patrols and, much against the advice of the line officers, just doubled the danger.

If plenty of listening posts are thrown out they can give all the warning necessary. Little can be seen in No Man's Land at night and the best way to detect the approach of the enemy is to hear them. Listening posts are best for this, as they are perfectly quiet with their ear near the ground. Besides, they are in communication with the front line, by means of tug wires, while patrols have no communication whatever. A listening post does not mask the fire of the trench.

Equipment of Patrols.—Patrols should never wear steel helmets, as they clink when they hit a piece of barbed wire, show an unmistakable outline, prevent crawling with the face on the ground, and it is seldom that a patrol is bothered with shrapnel. Revolvers and bombs are the only arms carried. Rifles are too unwieldy, noisy and in a few moments are unfit for use, due to the mud. The best revolver is the 45 Colt automatic. If care is taken no mud gets into the working parts and the rapidity of action and reloading offset all disadvantages. In crawling the revolver can be held out front in the right hand with the chamber loaded, but the hammer let down or the safety catch on. By resting the handle on the ground, the strain is removed from the arm and no mud will get into the working parts. In firing at night so many shots are wasted, in misses, that quick reloading is essential. Two Mills bombs carried in the hip pockets are about all that can be carried with any comfort. All members of the patrol should be equipped with rubber suits that tie around the ankles and wrists and lace up the back. They must not fasten in front, as the strings would get tangled in bits of broken wire on the ground and the opening let in the mud. The material is soft and does not rustle. Before going out each man should roll in the wet mud, for the mud from the previous night has dried and is of much lighter color than the wet mud. Hands and faces should also be covered with mud, and also the outside of revolvers if it is a moonlight night and the gun metal glistens. A very important thing is to have each man carry gum or peppermint to use in case he has to cough. Most scouts have a cold, due to being wet every night, and the strain of patrolling breeds a desire to cough that it is impossible to overcome. A cough close to the enemy means certain detection. There should be no articles in the pockets of the uniform under the rubber suit. If even a small article is in a blouse or breast pocket it interferes with crawling and the constant pressure against the flesh is very painful. It is bad to wear a belt outside the rubber suit, as while sliding along the belt will gather up a large wad of mud that is very annoying. No holster for the revolver is needed.

All forms of identification must be removed from scouts, such as:

Identity Discs.
Patches.
Regimental Buttons.
Cap, Collar and Shoulder Badges.
Pay-books and All Letters.

No article of clothing or equipment can have the battalion number on it, for even a handkerchief, with the number of battalion on it, if it is captured, gives all the information that a successful raid gives.

Patrol Formations (Fig. 8).—There are a large number of different formations, but the best for general purposes is the " wedge formation."

The main advantage of the " wedge formation " is that it can be formed into a defensive formation facing any direction in the shortest possible time. The best defensive formation for bombing of this nature is a line facing the enemy; first you have all your men in action, second it is the most difficult target. It is easy for the enemy to get the direction at night but very difficult to get the proper range.

The drawings explain themselves. The officer simply calls out which formation to take and then orders an advance or retreat, according to circumstances. After being seen commands can be given, as concealment is no longer possible.

It is often advisable to take a man from one of the flanks of the wedge and have him follow in rear to prevent surprise from that direction.

If any enemy patrol is met the best policy is to form line facing them, fire one bomb apiece and rush, after your bombs have exploded. The enemy bombs are nearly always time bombs and by rushing in close with revolvers you usually pass or leave their bombs before they explode. Another advantage of a quick rush is that if any of the enemy have been wounded or killed their comrades will not have time to remove them, and important identifications may be secured.

As a rule, a German patrol will not face a discharge of Mills bombs and a determined rush of even half their number. There is little danger at three yards from a German "potato masher," while it is nearly certain death to be standing twelve yards from a Mills bomb. Immediately on throwing the Mills the patrol should lie down and start revolver fire until the bombs have exploded. To be standing is to court danger from our own bombs.

Action for a Patrol if it is Seen from Enemy Line.—If seen from the enemy line one of two conditions exist. Either the patrol is within bomb range, say forty yards, or it is not. If within bombing range, as is the commoner case, the patrol must take quick action and run for it, regardless of rifle fire, until out of bomb range. The first thing to happen will probably be a sputter of rifle fire followed by a volley of bombs. Then lights will go up and be kept up. Before one light goes out another will be fired. Next a machine gun will be very likely to open fire. When the machine gun opens the patrol must get into shell holes, for it will be nearly as light as day. The lights and machine gun will keep the patrol pinned to their hole. If within bomb range a German party in their front line will leisurely proceed to bomb the patrol while they are held in the trap. If out of bomb range the patrol can take to a shell hole and stay there until the machine gun stops and the excitement dies down. The patrol must be careful that the gun has really stopped and not move at once, for often the gunner is waiting for this and opens suddenly after a few moments' pause. The thing to remember is to get out of bombing range before the machine gun gets into action.

Method of Crawling.—It is difficult to describe the way to crawl without giving a demonstration. It is not necessary to get down and crawl until within 125 yards of the enemy lines, unless it is a very bright night, or an unusual number of lights are being fired. To do so wastes too much time and needlessly tires the men. Up to within this distance the patrol can move by crouching or on its hands and knees. After passing the hundred-yard mark increasing care must be taken until when, within fifteen or twenty yards, when movement is only possible by inches. Only highly trained men can hope to escape detection at this distance.

When crawling, the main thing to avoid is any sudden movement or the showing of any outline of the head or shoulders. The body should never be raised a particle from the ground so as to let any light between the two. For the same reason it is necessary to be very careful not to allow the bent elbows or the feet to leave the ground. The legs should be kept as close together as possible and the arms not allowed to be spread out any more than necessary. Before starting to crawl the caps should be turned around with the visors to the rear. There are two reasons for this, first that with the visor in front it is impossible to get the face close enough to the ground and second, that the turned cap gives a German appearance to the head. For the latter reason the caps must be turned around again before entering our own lines. When on the move never lift the head to see where you are going. The face *must* be touching the ground. If it is absolutely necessary to look keep one cheek on the ground while doing it and use just one eye. Before starting to move you should have decided where you are going. One move is usually not more than from one to five yards, when a pause of two or three minutes is made to observe.

When a light goes up every man *must* remain absolutely still no matter what position he is in. Even if he is standing up in the enemy's wire the chances are that he will not be seen, if he does not make a move. It is instinctive to take cover when in such a position, but it is certain detection to move even an arm. While a light is up it is harder to see a still object than when there is no light, because there are so many shadows thrown that a man may be easily mistaken for one. If, while you are in a badly exposed position and a machine gun open, it is natural to think that it is firing at you and the desire for cover is almost irresistible, but the chances are that you are not being fired at and if you remain cool and quiet you will escape unhurt. This is one reason that it takes long training to make a good scout. Without practice hardly any officer or man can stand up in apparently plain view of the enemy without crouching slightly and that is sufficient to give the party away.

Capture of Isolated Posts.—There is very little to be said on this subject, except that it is a very difficult and dangerous piece of work. The capture must be made without any noise, for if the main trench is alarmed lights go up and you are held in the advanced post and bombed out at leisure. The only time when this kind of thing is practical is when there is no wire around the sap leading back to the front line and you can slip up the sap into the post. It is almost impossible to approach close enough above ground to force a surrender without a bomb being thrown or the alarm given. In most cases it is simpler to chance hitting a post and endeavor to enter the front line and then remain hidden behind a traverse until someone comes along and put a gun in his back. If discovered, and alone or with one man, try to get over the paradose and hide there. The enemy will not expect you there. If a party is with you make a rush for No Man's Land. Some may escape. These stealth raids have ceased to be a success lately as, after a year's experience, the Germans are beginning to be more alert. The only practical method now of getting prisoners is to organize a real raid with artillery as described in chapter on Trench Raids.

The one thing necessary for success, in obtaining information, is that we have absolute control of No Man's Land. We must arrange matters so no German dare come out beyond his front line parapet. To get this control means you have to fight for it and by badly defeating the German patrols a number of times teach them not to come out. Our men are better man to man fighters, they are natural born scouts and like the individual bomb work. They can think for themselves and fight for themselves, and at present have a better bomb. The German does not like No Man's Land, he

is a large group fighter and doesn't like to have to rely on his own ability. He hasn't the patrol organization necessary, and those who go out are often volunteers with little experience in the work. As a rule his patrol will run if attacked in a determined manner by half their number.

On entering a new front combat patrols should be sent out and kept out until absolute control is obtained. It can be done. On the Canadian Corps frontage it was a very rare thing to even see a German in front of his wire, and never since 1915 have they had control on that front. It was aggressiveness that accomplished this result.

This control is of vital importance and in a small way means what control of the air does. Without it a unit is fighting blind. A unit controlling No Man's Land can send over raids that can go almost up to the enemy wire to wait for the barrage to lift. The enemy raids can not leave their trench without being seen, and an auto rifle thus have time to open fire. Before an attack control must be had to determine the condition of the enemy wire, etc.

This control must be fought for, but is worth the fight and should be a matter of honor with every unit. It is one of the few chances there is for individual fighting, and in a way is a gauge of the morale and esprite of the unit.

CHAPTER IV

FRONT LINE OBSERVATION

OBSERVATION

(1) By observation in this case is meant the method of obtaining information from posts within our lines as distinct from the method of obtaining it by patrols.

(2) Organization.—(*a*) The organization of the battalion Intelligence sections vary in different battalions, according to the views held by the different battalion commanders. An organization that has proved satisfactory in every way is as follows:

1	Intelligence Officer (O. C.)
1	Scout Officer
1	Scout Sergeant
1	Sniping Corporal
1	Observing Corporal
2	Scout L/Cpls.
4	Snipers
10	Observers
12	Scouts
1	Cook
1	Servant
35	Total All Ranks

Under the subject of observation only the observers and snipers are considered. These are under the direct command of the Intelligence Officer and are attached to battalion headquarters for rations and accommodation.

(*b*) The Brigade Intelligence Section consists of:

1	Officer (Capt. Staff)
2	N. C. O.'s
18	Men
21	Total

They are under the immediate command of the Brigade Intelligence Officer and are attached to the Brigade Subordinate Staff for rations, accommodations and discipline.

Neither the battalion or brigade sections are available for any working parties, fatigues or orderly duties, except such as are necessary in connection with their Intelligence work.

(3) DIVISION OF RESPONSIBILITIES.—(*a*) The general principle of Intelligence is that the Intelligence branch of each formation is responsible for the collection of information in that formation, the collation of the information for the use of the commanding officer and the distribution of that information to whom it concerns and who can make use of it.

(*b*) Battalions are responsible for the collecting and forwarding of the information about the ground between their positions and the enemy's position and any obstacles in that area, for locating the enemy's front line and for the information concerning that line and the immediate support line. Any observations made in rear of these lines are reported and act as a check on the data obtained by the Brigade Observers.

(*c*) Brigades are responsible for locating the enemy's approaches, support and secondary lines and for the information pertaining to those lines, also for the direction from which the enemy's batteries are firing, the positions of any forward batteries and for information concerning movements in rear of the enemy lines.

(*d*) The battalion Intelligence Officer is responsible for the following:

1. The disposition, training, administration, and discipline of the battalion Intelligence Section.

2. The collecting and compiling of the reports from the companies and the battalion Intelligence Section.

3. The compilation of reports from the brigade Intelligence Section for the use of his Commanding Officer.

4. Informing company commanders of any information regarding their fronts, at the earliest possible moment.

5. Notifying the brigade Intelligence Officer of any changes in our trenches, not shown on current issue of maps.

6. The issue and collection of maps and air photographs.

7. The compilation of the battalion Log Book and

supervision of the keeping of the Observation Post Log Book, and patrol Book.

(*e*) The Brigade Intelligence Officer is responsible for the following:

1. Disposition, training, administration and discipline of the Brigade Intelligence Section.
2. Collating and forwarding of the information obtained from the Brigade and Battalion Sections and the Artillery Forward Observation Officer.
3. The issue, supply and correction of maps, and the issue of aeroplane photographs to the units of the brigade.
4. The compilation of the Brigade Log Book.
5. Supervision of reliefs and the general supervision of the training of the Battalion Sections.
6. Any special reconnaissances that may be necessary.

The intelligence sections of battalions in support are at the disposal of the Brigade Intelligence Officer of the Brigade in the line for working parties in connection with observation posts or accommodation for observers.

(4) FORWARDING OF INFORMATION.—(*a*) All ranks must be impressed with the necessity of forwarding information regarding enemy movements, special activity or any definite identifications, to the formations it concerns at the earliest possible moment, besides including it in the daily reports. When any operations take place that lead to the capture of prisoners or equipment, the identification will be forwarded at once *by*

wire. (It is not necessary to forward more than one identification per unit encountered during each phase of the operation.)

Any man securing identifications should give them at once to the nearest officer, who will see that they are sent to battalion headquarters.

All captured equipment (which includes helmets, rifles, identity discs, portions of uniform, documents, letters, and any article of military value whatsoever) is the property of the government and must be forwarded for examination by the Intelligence Branch of the General Staff, except when instructions are issued that certain articles are not needed. Such of these articles as are not needed for exhaustive examination by the Intelligence Officer, are returned to the units, and all articles must be labelled with the rank, name, number and unit of the finder.

Before an attack or raid certain men should be detailed to collect all documents, etc., immediately after a trench is taken and to send them back before the counter-attack has a chance to recapture the trench. All identity discs that can be collected from bodies are sent to Divisional Headquarters. No discs are removed from prisoners or wounded.

(*b*) Reports from battalion observation posts are made up in duplicates daily, one copy remaining in the Observation Post Log Book and the other copy being sent to the Battalion Intelligence Officer, who combines this, with the reports from the snipers and the companies, in one report. This report is drawn up in triplicate before 7 P.M. and one copy sent to the Battalion Commander, one to the Brigade Intelligence Officer, and the third filed by the Battalion Intelligence Officer.

A second report is made up in triplicate every morning, before 7 A.M., containing the information from the patrol report, the night observers, and company reports. This is distributed in the same manner as the night report.

(*c*) Reports from brigade and artillery observations posts are drawn up in triplicate daily, one copy remaining at the post, one being sent to the battalion concerned, and one to the Brigade Intelligence Captain.

(*d*) These reports, together with the battalion reports, are forwarded by Brigade to Divisional Headquarters, where is drawn up the Divisional Intelligence Summary, which is sent back to the battalions and kept on file. When a battalion changes sector on the same Divisional Frontage, these files can be looked up and valuable information obtained.

Any special valuable information gotten by patrols or otherwise should be sent to Brigade by wire for transmission to Division.

(*e*) The ideal to be kept in view by all Intelligence Officers is the continual observation of the enemy by *trained* men. This necessitates absolute coöperation between the Intelligence Sections of the different units.

Observation posts must be very carefully selected both with a view to obtaining concealment and the fullest possible visual command of the enemy's lines. The Artillery has the first choice of positions, then the Brigade and finally the battalions. The post is usually located on the highest ground to the rear, that is close enough for the purpose. The garrets of houses, tops of mine shafts or slag dumps, etc., can be advantageously used for this purpose.

The subject of the selection and construction of observation posts is a long and difficult one and it is impossible to even touch it here.

Each observation post must accommodate two observers with room enough for a small table. Its approach must be concealed. The Observation Post is equipped with the following:

1 Telescope (High and Low Power Lens)
1 Prismatic Compass
1 Watch
1 Ordnance Map (1/10,000)
1 Special Map for Artillery (1/2,500) Explained Later
1 Protractor
1 Ruler
Paper, Etc.
1 Log Book

Usually there is only one O. P. per battalion, but in some cases more have to be used when no position is available from which the entire enemy line opposite the battalion frontage can be seen. There should be large sign boards leaning against our front line paradoes and main communication trenches so that observers can locate themselves. There are two observers on duty in each O. P. at all times when it is possible to observe. These men must be relieved every few hours, as it is a considerable strain to be continually looking through a telescope.

The following are some of the objects that observers are on the lookout for. List of Observations required. (For the use of Observers.)

Identification.

Enemy Defences:

1. Front and support lines.
    - (*a*) Trenches in Use.
    - (*b*) New Work.
    - (*c*) Repairs.
    - (*d*) Working Parties.
2. Saps.
3. Listening and Sniper's Posts.
4. Observation Posts.
5. Machine-gun Emplacements.
6. Trench-mortar Emplacements.
7. Mines.
8. Screens.
9. Cupolas.
10. Dugouts.
11. Occupied Buildings.
12. Strong Points or Defended Localities.
13. Rest Billets or Camps.

Enemy's Movement and Organization.

1. Routes and Tracks Used by Enemy.
2. Trench Tramways.
3. Light Railways.
4. Dumps.
5. Movements Observed.
6. Reliefs.
7. Location of Headquarters.
8. Miscellaneous Occurrences, Ruses, Etc.

Artillery.

1. Activity.
    - (*a*) Number Rounds.
    - (*b*) Calibre.
    - (*c*) Place Struck.
    - (*d*) Damage Done.
    - (*e*) Time.
    - (*f*) Direction of Flight.
2. Batteries Located.
3. Location of Observation Balloons.

Communications.

1. Telephone Stations and Wires.
2. Visual Signalling.

Airship and Aeroplane Movements.

Two of the remaining six observers work with the snipers to observe the effect of their fire and help find targets. These observers must be equipped with telescopes or good field glasses. For this form of observation the wire gauze observation post is the best. This consists of a dummy header sandbag, which is placed in the parapet and in the front end of which is sewed a strip of wire gauze, an inch and a half wide and eight inches long. This gauze is just the color of the sandbag and cannot be seen six yards away. The bag is empty and has a hole in the bottom through which the head can be inserted until the eyes are level with the slit. The gauze does not interfere with the vision in the least and to all intents the observer is looking right over the top without exposing himself.

This leaves four observers, two of whom are detailed to report on all enemy shell-fire. They report the number of shells, calibre, time, place of striking, damage done, direction fired from and whether fired at extreme range or not.

The remaining two men act as front line night observers. They are equipped with watch, prismatic compass and note-book and report on everything that happens during the night. These men can be placed at opposite ends of the frontage and take simultaneous bearings on anything seen. Some of the points covered in their reports are:

(*a*) Machine-gun fire and location of gun from bearings if possible.

(*b*) Trench-mortar fire and gun locations.

(*c*) Enemy rifle fire.

(*d*) Enemy artillery fire.

(*e*) Any unusual lights or signals.

(*f*) Any noises or indications that lead them to believe that a relief has taken place or is on at the time. If going on at the time the Intelligence Officer is at once notified and the artillery given the data which they can use to great advantage. The packed communicating trenches offer a fine enfilade target for the guns.

(*g*) Enemy working parties, patrols, etc.

(*h*) Time and position of any horse transport heard. (Can use artillery next night.)

Very often valuable information is obtained by the trained men, at night, who have no other duties but to observe. Sentinels and officers are busy with other duties and probably would not notice small, apparently unimportant occurrences, and if they did notice them would forget to report the matter, not realizing its importance.

(5) SNIPING.—This is another large subject in itself and can only be touched upon under this head. The snipers' course at Pernes, France, lasts for a month, so some idea can be obtained of the size of the subject. The men are not taught to shoot during this time, for they are supposed to be good shots already, so the entire time is spent in imparting information of the subject.

The battalion snipers should be selected from the best shots in the unit and then given the opportunity of attending the best sniping school in the vicinity. At these schools they learn the best methods of properly constructing their posts and of utilizing their ability to shoot.

No sniping post should be allowed within twenty yards of an observation post, as it attracts attention that may lead to the discovery of the O. P.

At present there are few really good sniping posts in the front line and Intelligence Officers should make it a point to have their sections make as many as possible. Except under exceptional cases sniping posts should not be relieved during daylight and great care must be taken not to make a path that can be seen from an aeroplane. Of course if the post is actually in the front line it can be relieved any time. No men or officers except snipers must ever use a sniping post without the authority of the Intelligence Officer.

(*a*) The main objects of sniping are:

(1) To prevent enemy observation of our lines from his front and support lines.
(2) Silence enemy sniping.
(3) Inflict casualties and lower enemy morale.

Without our snipers being keen it is possible for the enemy to keep our lines under a close observation and to greatly improve his artillery and trench-mortar fire. Snipers must be continually on the alert for these observers, and remember that a well-directed rifle shot that kills an Artillery Forward Observation Officer will silence the enemy battery, for a time, as effectively as if our artillery put it out of action.

At the end of the day's work the sniping corporal submits a report to the Intelligence Officer. It often happens that snipers and their observers see things that cannot be seen from the battalion O. P. and their report is a material help in drawing up the battalion Intelligence report.

(6) PARTIAL RELIEFS.—When a battalion takes over a new sector or one from which they have been out of for a time the observers see a great many things during the first few days and hand in very lengthy reports, which usually contain nothing that was not reported by the previous battalion. In this way they waste their time and that of their brigade. Besides this, it takes about half the tour to become used to the new front. To overcome this difficulty a system of partial relief of observation posts has been adopted. The incoming battalion sends observers ahead and the outgoing one leaves some behind, according to the following schedule. Suppose the inter-battalion relief takes place on the night of August 13–14th.

Outgoing Unit.	*Incoming Unit.*
Aug. 12.....3 men at O.P.	Aug. 12.....0 men at O.P.
Aug. 13.....2 men at O.P.	Aug. 13.....1 man at O.P.
Aug. 14.....1 man at O.P.	Aug. 14.....2 men at O.P.
Aug. 15.....0 men at O.P.	Aug. 15.....3 men at O.P.

(7) TRAINING.—When at rest billets the training of observers and snipers is in the hands of the Intelligence Officer.

The training of the snipers is fairly simple and consists of brushing up in the training received at the schools. They should construct a 200-yard target range and practise firing at moving figures, silhouette targets and in calibrating their telescope sights. If time permits they should be given a chance to construct sniping posts.

It is a rather more difficult matter to properly train the observers. They should be given a thorough training in map reading, use of prismatic compass, sketching, and have frequent lectures and practices in making out reports. Besides this, it is important that they should be absolutely familiar with the best way of obtaining quick and accurate artillery, trench-mortar, or machine-gun fire when a target is seen. In this connection they must know what constitutes a target for the different arms. The particular branch of map reading most used is the accurate location on the map of objects seen on the ground. Only too often it is impossible to take but one bearing and it then comes down to the ability to judge the position from its relation to the surrounding objects. With experience and training some men become extremely accurate at this work and these men must not be used in an attack, as they are too valuable to lose.

(8) Coöperation with Artillery.—This is one of the most important duties of the Intelligence Officer. It is up to him to establish the relations with the artillery, for it is seldom that they will take the initiative in this matter, though keen to help if it is brought to their notice. As a starter the Intelligence Officer should make it a point to know personally the artillery officers behind him.

When in reserve or support it is a good plan to visit them in their dugouts and ask them over to yours. Men who know and like each other work together much better than strangers, and the artillery Liaison Officer in the line and the Battalion Intelligence Officer should be together all the time. The Intelligence Officer should endeavor to learn what he can about the guns and their troubles and limitations so as to be able to ask more intelligently for their fire. At the same time the artillery officers can pick up a better idea of the difficulties of the infantry work.

Without this coöperation many excellent chances to inflict damage on the enemy are lost. Battalion observers frequently see excellent targets for the artillery but are unable to get the information through until it is too late. The usual method is to send a runner to find the Artillery Forward Observation Officer or Liaison Officer, bring him to the O. P. and then he has to get in touch with the guns, all of which takes usually over an hour.

The following arrangement has been found to work very satisfactorily:

On entering the line the Intelligence Officer draws a map, in duplicate, to a scale of 1/2,500 (about two feet to the mile). This map is simply an enlargement of the air photographs or of the ordnance map, showing the enemy lines on his frontage. Each enemy trench is given a name no matter how small the trench may be. Each trench junction is numbered. When completed, one copy is given to the artillery O. P., who draw their zones of fire and range circles on it, and one copy is kept in the battalion O. P. This copy is placed on a board and oriented so that the telescope with a straight-edged stand acts as an alidade does in a plane table survey. With the telescope sighted and the ruler edge of the stand passing through the point on the map where the O. P. is, a line drawn along the ruler, which is parallel to the line of sight, will cross the enemy trench at the proper point. If there is now a direct telephone line to the artillery O. P. the target can be given to them in a moment as follows:

1. Party of 20.
2. Moving west in " King " trench.
3. Fifty yards east of 25 (trench junction).

By this method the artillery can open fire within a few moments. The range and angle for deflection can be read off the prepared map at a moment's notice and fire delivered at once. If the target cannot be seen from the artillery O. P. the guns can be registered by the battalion observer telling the artillery O. P. how many yards' correction are needed.

The artillery are always willing to lay the necessary telephone wire but will not furnish the telephone. Intelligence Officers can usually borrow one from the battalion signal section, but should pick one up in the first battle and always carry it with him.

(9) HEADINGS FOR BATTALION INTELLIGENCE REPORTS.—

A. General Information:

1. Operations.
2. Identifications.

B. Enemy Lines:

3. Enemy's Front and Support Lines.
4. Saps.
5. Listening and Snipers' Posts.
6. Observation Posts.
7. Machine-Gun Emplacements.
8. Trench-Mortar Emplacements.
9. Mines.
10. Screens.
11. Cupolas.
12. Dugouts.
13. Occupied Buildings.
14. Strong Points (Including Defended Localities).
15. Enemy's Patrols.
16. Enemy's Rear Lines of Defence.*
17. Enemy's Activity.
18. Condition of Ground.

C. Movements in Enemy's Line and Organization in Rear:

19. Routes and Tracks Used by Enemy.

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* All information regarding the enemy's second and other lines of defence to be lumped together under this heading, no alternative headings being used as in the case of the Front and Support Lines.

20. Trench Tramways.
21. Light Railways.
22. Dumps.
23. Movements Observed Behind Enemy's Line (Personal and Transport).
24. Miscellaneous Occurrences in Rear of Enemy's Lines.
25. Reliefs.
26. Rest Billets (and Hutments).
27. Location of Headquarters (Regiments Inclusive Downwards).
28. Location of Headquarters (Regiments Inclusive Upwards).

D. Signalling:

29. Wireless Signals, Telephone Wires and Signal Stations.
30. Visual Signals and Signal Stations.
31. Light Signals.
32. Searchlights.

E. Gas:

33. Location of Gas Cylinders.
34. Wind Tests, Enemy and Ours (Smoke, Flags, Balloons, Etc.).

F. Artillery:

35. Enemy's Shelling (Artillery Activity).
36. Suspected and Located Batteries.
37. Armoured Trains (Heard, Seen, or Suspected).

38. Location of Hostile Observation Balloons.
39. Effect of Our Artillery and T. M. Fire.

G. Equipment (obtained):

40. Shells Other than Gas Shells.
41. Gas (and Lachrymatory) Shells.
42. Fuses.
43. Trench-Mortar Projectiles.
44. Hand and Rifle Grenades.
45. Miscellaneous Projectiles.
46. Flash-concealing Apparatus.
47. Gas Apparatus.
48. Smoke Apparatus.
49. Telephone and Telegraph Equipment.
50. Flammenwerfer.
51. Uniform.
52. Miscellaneous Equipment.

H. Air Craft:

53. Airship and Aeroplane Movements.
54. Types of Aircraft.
55. Distinguishing Marks on Aircraft.

I. Miscellaneous:

56. Enemy's Ruses.
57. Miscellaneous.*

A full description of any blind gun, or howitzer, shells, trench mortar or trench-mortar bombs of a new type that are found is invariably forwarded for transmission to Army Headquarters, who periodically notify those concerned what types are needed.

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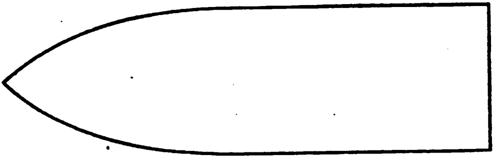
* To include all information that cannot be classified under other headings.

New types of fuses or fragments of hand or rifle grenades are forwarded to Army Headquarters at once for investigation.

The following is the form for reporting new types of shells:

(British Army Form W. 3363)

Note: It is more convenient if dimensions are given in millimeters. Rough sketch of shell to show detail.



Calibre ....
Nature of shell (Shrapnel or H.E.)........................
Date fired and where found................................
Coloring ....
Marks on shell body ....
....
....
Length without fuse ....
Thickness of walls ....
Thickness of base ....
Material ....
Number and position of driving bands ....
Width of driving bands ....
Number of grooves on driving bands ....

Diameter of fuse-holes at top ....
Diameter of fuse holes, threaded portion ....
Fuse markings ....
Fuse material ....
Nature of charge ....
Remarks ....
....
....

.........................(Signature)
.............(date) ....(Unit)
List of ....

(10) PROPOSALS FOR A CORPS INTELLIGENCE BATTALION.—There are a number of disadvantages to the existing Intelligence Organization of the lower units:

(*a*) *Lack of Time to Study the Front Properly.*—Battalions are continually moving from sector to sector and in each new position have to study the area from the very beginning to end. This wastes much valuable time and, as a result, over half the time is spent doing work that has just been done by the battalion that has left. This applies particularly to the patrolling of No Man's Land.

With, say three days of the six wasted duplicating previous work, it is impossible to obtain any really valuable information in the remaining time. Only the most prominent features can be examined and any details must be omitted. Besides this the information the battalion commander wants cannot be obtained until it is practically time for the battalion to leave the area, for it is necessary to work methodically from our line over to the enemy's. (See Patrols and Control of No Man's Land.) A patrol cannot go far across until it is more or less familiar with the ground.

(*b*) *Difficulty of Proper Training.*—It is almost impossible to train the section without prepared ground, O. P.'s, target ranges, sniping posts, etc.; and if it is attempted to construct these, the section is back in the line again before they are finished. Besides this, the sections are being continually called out for working parties, etc. This is against instructions, but is done, nevertheless, since brigades usually call for the entire strength of the battalion and forget that certain men are supposed to be exempt.

Often officers are placed in charge of Intelligence Sections who have not the slightest idea of what they are supposed to do. There have been cases where these officers could not read a compass. Conditions of this kind are very inefficient to say the least.

(*c*) *Discipline.*—The senior Intelligence Officers have no direct control of the different sections. If instructions are not followed they have no recourse except through the battalion commanders, who may take proper steps or may not.

(*d*) *Equipment.*—It is practically impossible to obtain proper equipment at present. The indents are invariably disapproved on the ground that Intelligence Sections are not on the Establishment. This is true but, nevertheless, they are in use and necessary, and either the Establishment should be corrected or ignored in this case. Patrols have to go out, and yet cannot obtain revolvers, which are the only weapons they can use. Machine-gun companies that are 'way behind the line get revolvers, but those who go out in No Man's Land every night cannot. This state of affairs holds for all the equipment necessary, such as telescopes, compasses, watches, etc.

All these difficulties could be overcome by the creation of a Corps Intelligence Battalion. This would call for no more men than are at present used solely for this work, but would employ these men in a much more efficient manner.

The battalion could have its billets well back in a permanent place and soon have every facility for training. The training would be uniform throughout, and if a good idea is developed will be at the disposal of the entire corps instead of just one battalion. The training would be under the direct supervision of men especially qualified instead of in the hands of men who have only a superficial idea of the work.

The greatest advantage, though, would be that the sections would always go into the same sector for a number of months. After a few weeks they would become so familiar with their sector that they could obtain accurate information about even the most minute details. Accurate maps of No Man's Land would soon be made and when a battalion moved into the line, its Commanding Officer would receive a detailed report from the local Intelligence Officer, at once, instead of waiting until the end of the tour, for even the most imperfect information. With the same men observing it would be a very short time before all the enemy machine guns and trench mortars would be accurately located. With the same men always working together almost perfect coöperation should be established with the artillery and trench mortars. The men would also take an interest and construct proper O. P.'s, and sniping posts, if they knew that they had time and would use them themselves. Besides, with senior officers in charge proper equipment could be obtained.

In case of offensive the required number of men could be attached to each battalion and get back much better information than the half-trained men at present used.

(11) INFORMATION DURING OPERATIONS.—During operations, scouts are used to reconnoiter the ground previous to our advance, and to locate the enemy line. In other words, contact patrols are sent out.

Observers and snipers move forward after the last infantry wave and construct a rough battle O. P. and carry on as far as possible in the usual manner.

It is impossible to go into the subject of observation during an action, but it is necessary to state that the fate of an entire operation often hangs on the quality of the information sent back.

The following is an actual battalion Intelligence report made on Vimy Ridge. This was just a normal, fairly quiet day, with nothing of special importance happening, and the example is simply given as a matter of interest.

INTELLIGENCE REPORT.

14th Canadian Battalion, Royal Montreal Regiment.
DECEMBER 15th, 1916.

Enemy Defences.

	Observation was poor owing to low visibility.
1. S.15.c.5.4.	Fresh earth is visible on parapet, enemy has evidently deepened his trench at this point.
2.	Enemy has been very busy revetting and deepening his support and communication trenches opposite our front.
3. S.15.c.5½.3¼.	The breastworks of the enemy trench at this point are smoothed down for about five feet as if to allow for the traversing of the machine gun. No armour plate can be seen or anything like a loophole.
4. S.15.c.5.4.	A new sniping plate placed during the night at this point has been kept under close observation.
5. S.15.c.5.4.	Hammering was heard in this vicinity as if nailing timber 10.20 A.M.

Enemy Movements.

1. S.15.a.2.½.	A footpath is visible from the front line back to the support line. This is probably a route taken by working parties at night.
2. S.15.c.4.9.	Three men carrying shovels passed low part of communication trench. Time 8.55 A.M.
3. S.15.c.6.7.	Two dogs, one a terrier, the other a setter were seen at this point.

4. S.15.c.½.7½. Enemy listening post observed relieving at this point at about five A.M. They were fired upon, but it is unable to state result.

5. Sounds of horse transport moving rapidly were heard behind the enemy lines opposite HARTUNG RIGHT at 6.10 this morning.

6. A railway train was heard by the bombing post at ERSATZ CRATER at one this morning.

7. An enemy observing plane, shortly after 11 A.M., appearing and flew over our lines coming down low enough to be fired at by our machine guns. It was not fired at by our anti-aircraft guns, nor was there one of our 'planes in the neighborhood.

8. S.15.c.1½.3. Two distinct vibrations were felt at this point from under ground at 10 A.M.

Enemy Sniping.

1. S.15.c.2½.7.
S.15.c.3½.5.
S.15.a.1.1½.
At these points it is suspected that the enemy has put in loop-holes which have been fired upon by our snipers.

2. S.15.c.5½.3½. An enemy periscope was broken at this point by our snipers at 9.40 A.M.

Enemy Artillery. During the day the enemy artillery fired the following rounds:—

Time	Number of rounds	Nature of Gun	Objective
10.10 A.M.	20	4.1″	Zouave Valley
10.30 12.05	104	4.1″	Vincent & Snargate
12.30 to 4 P.M.	15 duds	4.1″	S.20.b.1.1.
3.10 P.M.	4	5.9″	Ersatz
3.15 P.M.	3	5.9″	Gordon Avenue
3.20 P.M.	1	Shrapnel	International
3.20 P.M.	6	5.9″	Zouave Valley
3.25 P.M.	2	5.9″	Ersatz

Most of these shells came from Bois De La Folie.

The enemy did no damage to our trenches except for two direct hits made at the junction of Vincent and Snargate South.

From the rapidity with which these shells were fired it appears that the enemy's 4.1 artillery has been considerably increased.

Our Artillery.

Our eighteen-pounders were active between 11 and 12 A.M. and from 3.30 to 3.45 P.M., shelling front and support lines.

From 2.45 to 3.45 P.M. our 4.5s were active, firing at about one minute intervals.

At 4 P.M. our medium trench mortars fired 55 rounds. At the same time the STOKES GUNS fired on the enemy front line and supports. There was no enemy trench-mortar retaliation. His entire retaliation during the day being with artillery.

Lieutenant and Intelligence Officer,
14th Canadian Battalion.

HOW THE REPORT WOULD BE USED.

Enemy Defences.—Nos. 1 and 2 show that the enemy is working on the trench and that it is in actual use. A large number of trenches are not in use and it is a waste of shells to bombard them.

No. 3 will call for careful watching, and if a machine gun is put in can either be destroyed at once or left unmolested until we attack. If shot up at once another one will be put in, in another place and it is often better to let a known gun alone than to put it out of action and not find the position of the new one, until it opens on our raiders or attacking troops. The action adopted depends on local conditions and how likely we are to "go over" at that point in the near future.

No. 4. Will be watched by our snipers. If the enemy sniper is troublesome our field guns or trench mortars will put him out of action if our snipers are unable to do it.

No. 5 gives the same indications as Nos. 1 and 2. A dugout may be under construction.

Enemy Movements.—No. 1 will probably have a machine gun trained on it and will be swept by intermittent fire during the night. This will cause a few casualties and interferes with his ration parties.

No. 2 will be watched by our snipers.

No. 3 may give information to our staff that a relief has taken place. If the same dogs keep reappearing at fixed intervals, it is reasonable to suppose their masters are reappearing also. This with other minute details may all together let the staff determine the relief schedule of the Germans. If that happens the enemy will suffer heavy losses from our shell fire on the first relief that takes place after this.

No. 4 is valuable for the scouts to know. They can either drive the post in or endeavor to capture it. In any case they will not be surprised by a bomb from this point.

No. 5 artillery will probably fire at this time and place following morning.

No. 6 not important unless it acts as confirmation of other data possessed by Staff. This should not be omitted, for all the line officer knows, it may be the final piece of evidence needed to complete some theory of the Staff's.

No. 7 a gentle reminder to the Royal Flying Corps to keep awake.

No. 8. This is a very vital piece of information. It means mining is going on and the information should be sent, by special runner, to the tunnelling officer on your front. He will then investigate. It may be your own miners, but no chances can be taken with a thing of this kind.

Enemy Sniping.—Nos. 1 and 2. General information for the companies and for any units relieving you. These points will be watched.

Enemy Artillery.—This information is a check on the brigade report and helps to determine whether the enemy is increasing his artillery. From the points fired at and the number of rounds fired it is often possible to tell whether new units are registering their guns. This would indicate either an increase in concentration or a relief.

Our Artillery.—General information for our front line men as to what our guns were doing.

CHAPTER V

COÖPERATION BETWEEN INFANTRY AND ARTILLERY

(1) Lack of Coöperation in the Early Stages of the War.—For quite a time after the war began, there was little or no coöperation between the infantry and the artillery and what was worse there was a bad form of antagonism. This was due to a number of causes. In the first place neither branch knew practically anything of the other and had no conception of the troubles and limitations that controlled the actions of the other. Both branches were prone to too much secrecy and disastrous operations were carried out without the necessary consultations taking place. It used to be nearly a physical impossibility for an infantry officer to learn anything about the batteries covering him or to visit the artillery O. P.'s on his front. Another item in this awful misunderstanding was the shortage of shells. The infantry blamed the artillery and the artillery were too touchy to take the trouble to explain.

(2) Gradual Improvement.—When matters were at their worst some genius must have taken charge, for an improvement started due to no one that could be traced. This improvement was very gradual at first and sort of half-hearted, but was soon going along full

swing by leaps and bounds. Personal acquaintances between the two arms became the watch word. There were plentiful invitations from the Infantry Messes to the Artillery Messes covering them and vice versa. As a result of these dinners, bridge parties, etc., and of the information gained here of each other's difficulties, each branch began to realize that the other was not entirely composed of a collection of grouches, and that a large part of the blame could be laid on each side.

One of the first things noticeable was that where an artillery man and infantry man met there were friendly words of greeting and mutual congratulations over a good piece of work done, instead of the old curses and black looks. But above all, each branch began to ask the other questions and would get pleasant answers.

This work was greatly helped along by a series of good addresses given by artillery officers to the infantry and vice versa. From this time on it was common to see infantry officers at the batteries and O. P.'s, and they were always certain of a warm welcome by personal friends. The author has the privilege of counting many of his best personal friends amongst the artillery that has covered the fronts he has been on and recalls with great pleasure the times he has been allowed to fire different calibre guns into Fritz's back country. He is also certain that numerous artillery officers have enjoyed their trips to sniper's posts for the chance of a little hunting.

A big factor in the maintenance of the now almost perfect coöperation is the presence of Artillery Liaison Officers in the front line. There is one such with each British battalion and he doesn't just sit around the headquarters dugout. He is supposed to be the shadow of the Battalion Intelligence Officer and follows him all over the frontage. These two work hand in glove for the discomfort of the enemy and the increased safety of our troops. They compare maps and at once correct any disagreement. The names and locations are checked of all sections of front line trench, bays, posts, craters, gaps, etc., and any changes at once given to the artillery. Serious mistakes will be made unless these maps are identical and it will be the infantry's fault. When the battalion observers locate an enemy battery, trench mortar, or machine gun the information is given to the artillery and they pass back the information as to the result of their fire. Each branch has a pride in its share of good work. The following incident will illustrate this close harmony in which the two branches work and which would have been impossible a year and a half ago.

Opposite the city of Lens there is a huge pile of slag, from one of the coal mines, called the Double Crassier. It is a long mound, about one hundred and fifty feet high and twelve hundred yards long, with a very narrow top of about eight yards and extremely steep sides. One end of this Crassier is at our front lines and from there it runs across "No Man's Land" to quite a distance behind the enemy front line. We had dug a sap running up the end in front of us and a narrow trench along the top so that the post at the end was about on a line with the German front line way down below in No Man's Land. The Germans also had a sap on top that ran up to within ten yards of ours, but they were so close that a sort of " status quo " was established. From this wonderful watch tower all surrounding country could be seen. On the right clear down to Vimy Ridge and on the left to Loos.

There had just been a number of successful raids against the Germans and they were very jumpy and kept numerous machine guns swinging over the whole country side, every night. These guns, while they did little damage, were an awful nuisance and to some extent interfered with the nightly working parties that were in the open. Besides this there were a number of large trench mortars (Minnenwerfers) located very near the foot of the Crassier which had a habit of lobbing their huge bombs over top of the Crassier into the trenches of the battalion on the North. Then while up on the Crassier one night an officer observed the relief of a German listening post crawling out in the snow directly below him and took its position, and the times of the relief.

Then a little surprise party was organized. Some artillery friends and one from the brigade machine guns were taken up on the Crassier and they immediately entered into the spirit of the game. (Right here it ought to be stated that when they have plenty of ammunition as they always have now, the artillery are almost childish in the joy they take in letting off their guns at almost any target the infantry finds for them.)

When the visiting officers had grasped the idea a systematic effort was made to locate all the enemy emplacements and have these accurately registered from the Crassier in the daylight. This registration was done in such a way as to lead the enemy to believe it was just desultory shelling. The brigade machine guns were then accurately registered on the path taken by the relief of the listening post. This was done by watching the bullets kick up the snow.

When this work was done a " tug wire " was rigged up from a good observation post on the Crassier along the top and down the back to a place where a man with a signal lamp was invisible to the enemy, but could be seen from an artillery observation tower in a town well to the rear. In this tower was an artillery officer with a set of push buttons that connected with the different batteries.

When all was set and it was dark an infantry officer crawled out to the observation post, tugged a few times on the wire in his hand to see if his signal man was on the job and then waited for developments.

The first thing to happen was for one of the trench mortars to go off. The flash had hardly died away before one tug was sent back, one flash given on the lamp, one button pushed in the tower, and four, four and one-half inch shells landed on the trench-mortar emplacements. This must have surprised the enemy, but didn't quite put him out of action, for he fired again and the same process was repeated. He was never heard of again.

Practically the same thing happened to the other trench mortars, and then the German machine guns started their nightly song. They received the same treatment as the trench mortars. Only three-inch shells were used. A machine gun can't very well compete with a salvo of well-placed three-inch shells. There was no more machine-gun fire for days and then they would just fire testative bursts to see what would happen.

The serious part of the work now over there was a lot of amusement caused by playing with the relief for the listening posts. Every time they would try to crawl out a well-directed burst of machine-gun fire would land on them and they would slide into a shell hole. If one man lifted his head the gun would open. It must have caused a lot of surprise and wonder as to how a machine gun about 600 yards away could see to fire at the slightest movement of one or two men on a dark night. It probably never entered their heads that a Canadian Infantry Officer was lying straight above and could see every move against the snow. This very interesting game continued for some time until a man with a rifle couldn't resist the temptation any longer and shot one of the Huns from the top of the Crassier. This must have put them onto the game at once and broke up the " status quo." Shells began to remove the top of the Crassier, so the game was called off for that evening.

This is given just to show how all the branches can work together and cause a great deal of local damage. When this kind of thing is extended over the entire front it amounts to something. This was done under very special conditions, but other conditions and other opportunities exist at other places and must be utilized whenever possible.

(3) The following is a rough idea of the amount of artillery available on a Corps Frontage where no offensive is contemplated.

(*a*) Corps Heavy Artillery:

8	4.7″	Guns
4	6.0″	Naval Guns
12	6.0″	Howitzers
6	8.0″	Howitzers
8	9.2″	Howitzers
2	15.0″	Howitzers

(*b*) On a Corps Frontage there are three Divisions of Field Artillery in the line and one in the reserve. A division of Field Artillery covers an Infantry Division and is composed of three Brigades. A group of the Corps Heavy Artillery is also assigned to an Infantry Division.

(*c*) A Brigade of Field Artillery covers an Infantry Brigade and consists of:

12	18-pounders (3″)
6	4.5″ Howitzers
	Heavy Trench Mortars
	Medium Trench Mortars
	Anti-aircraft Guns

(*d*) A Battalion is covered by (if two Battalions of Brigade are in the line, as is usually the case):

6 18-pounders
3 4.5" Howitzers
1 Heavy Trench Mortar (152 Pounds)
2 Medium Trench Mortars (60 Pounds)
4 Stokes Guns (13-pounder, Approximately)

(*e*) In case an offensive is being planned or the enemy is planning one the artillery is greatly concentrated and absolutely no estimate of the guns covering a unit can be made.

(*f*) Any infantry officer in the front line can call for the fire of the Field Artillery Brigade covering him, but he cannot call for the fire from any of the Corps Heavies direct. This last call goes through Battalion and Brigade Headquarters and sometimes even has to go through Divisional Headquarters, according to local arrangement. This takes a very short time, as special arrangements have been made to facilitate these messages. This indirect method only applies to retaliation or "sträfing" fire, for if an S. O. S. signal is given everything opens up at once.

(4) INFORMATION THAT THE INFANTRY SHOULD GIVE THE ARTILLERY.—(*a*) As mentioned before, they check up maps and at once let the artillery know of any changes in posts, etc.

(*b*) Distinctive sign boards should be put up against the paradoes of different sections of the front line, as it is very difficult to tell our trench from the enemy's when looking from an O. P.

(*c*) Immediately send in any bearings of Trench Mortars, Machine Guns, or batteries obtained, giving map locations of point the bearing was taken from and the time taken. You may only get one bearing, but others with other bearings may send theirs in and give enough data to locate the target.

(*d*) In calling for Retaliation the enemy rate of fire and calibre of his shells should be sent back so our artillery can know what size and rate to use.

The principle of retaliation calls for a faster rate of fire with larger shells than the enemy is using. Often a big artillery fight will start from a trench-mortar bomb being thrown over, the other side sends back two, which compliment is returned with four. Next some artillery is called in, beginning with three-inch they work gradually up the scale until the fifteen-inch may even get in the show. Then everything goes full swing, the infantry of both sides being the target, until one side calls quits and gets its artillery fire to die away.

(*e*) It is usually the German who gives away, both because his morale is not as good and his artillery is weaker than the Allies. After the German guns let up we usually pound away for a little while longer and then quit ourselves. After a few experiences of this kind the Hun infantry man will be loath to call for his artillery fire and will take a certain amount of punishment without coming back strong. We find out this limit to his patience and work right up to it.

(*f*) Any movement of the enemy that any infantry officer may detect or suspect, especially working parties, ration parties, or above all, reliefs, should be gotten to the artillery, through the Liaison Officer, just as quickly as possible. This is just the chance the artillery is looking for and at night the infantry are the ones who discover these things.

(*g*) The following is the kind of thing that an Infantry Lieutenant may have to do any night:

A German wiring party was seen and the men in the front line not allowed to fire. If they had opened up, the chances are that no Germans would have been hit, as it was night, and the fire would have driven them into their trenches with no damage done. The infantry officer decided on a zero hour and put three Lewis guns in position with orders not to fire until the time specified. He then ran down to the trench-mortar headquarters dugout and arranged for them to fire at the same time. Next he got hold of the Artillery Liaison Officer and arranged for the artillery to open at zero with a rapid fire.

At zero everything let loose, in a short burst, all together, the idea being to get over all the explosives possible in the short time it would take the party to get from their work in to their trench. From the cries the fire was highly successful.

(5) The following are some of the things that an infantry officer must take the trouble to find out for himself:

(*a*) What batteries are covering his front.

(*b*) Where the Liaison and Forward Observation Officers' dugouts are.

(*c*) S. O. S. signal.

(*d*) Where the trench-mortar dugouts are.

(*e*) Barrage lines (S. O. S.)

(*f*) Forward O. P.'s.

(*g*) Quickest way of getting in touch with his artillery.

The artillery covering him is just as much a part of his defense as his men and auto rifles, and he should know how and when to use it just as well as he does the other weapons at his disposal.

(6) The following are some of the things the artillery must be certain to tell the infantry:

(*a*) When their range will be dangerous to the front line or outposts.

(*b*) When a shot will be likely to bring heavy retaliation and what steps have been taken for a counter retaliation.

(*c*) Any changes in disposition.

(*d*) Any changes in barrage lines, S. O. S., or retaliation program.

(7) SHORT ROUNDS.—(*a*) These were the cause of most of the grievance of the infantry against the artillery, and this grievance was mainly due to the fact that the infantry didn't know the reasons for these shorts. They felt certain it was due to the gunners' carelessness. They now realize that this is so rare as to be negligible. The main causes for short rounds are:

1. Defective ammunition (charges or fuses).

2. Error of guns (50 per cent. and 100 per cent. zone error).

3. Heated or worn gun.

4. Prematures.

5. It may not be the guns covering your front.

(*b*) Immediate steps to be taken:

1. Do not lose your head.

2. Get men under cover if fault continues.

3. Advise artillery. Do not start the conversation by a flow of profanity. It will take just that much longer to reach an understanding, during which time you and your men are apt to be hurt.

4. Give artillery as accurately as possible:

Map location of bursts.
Type of shell.
Height of bursts.
Angle of fire.
Number of rounds and time.

If the above procedure is followed the matter will be quickly corrected and you will invariably find that it wasn't the gunners' fault.

(8) Coöperation During Advances.—It is during the advance that the infantry reaps the benefit of their efforts at establishing cordial relations with their artillery. Without the most perfect coöperation the best trained infantry is lost.

(9) Before the attack the infantry can be of immense assistance to the artillery in locating enemy bat-

teries, trench mortars, machine guns, O. P.'s, etc., and in reporting on the results of wire cutting. Since the infantryman's life depends on the excellence of the artillery, it is up to him to use every means, day and night, of getting all the information possible to the artillery. The trained scouts and observers do a good portion of this work and just before an offensive the battalion intelligence officer is one of the busiest and most important men on the front. He is a sort of general information bureau for his frontage and must be fully prepared to answer the most minute questions as to our own and the enemy lines. He will be called upon to give lectures to the battalion on the nature of the ground behind the enemy front line, as determined from observation, maps and air photographs. He will have to take all kinds of staff officers to his O. P.'s, and explain everything in detail. He will have to run the patrols all night and the O. P.'s all day. There is practically no sleep or rest for this officer at this time. It is on his shoulders that most of the responsibility rests for the close touch kept with the artillery.

(10) When the attack has once gotten to its objective, it is of vital importance that the artillery be notified at once as to just where our and the German lines are. It is no use calling for S. O. S. fire, when the counter-attack comes, unless the artillery know just where you are. They cannot put down a barrage without knowing where to put it. The best way to give them this information is by means of a sketch showing your position and that of the enemy as far as possible. These

little sketches can all be drawn, except for the actual line, before the attack starts, and take only a minute to complete. Information of when and where your battle patrols are being sent out must be given to the artillery at the same time, otherwise they may be cut up badly by our own fire.

A method of locating our lines that is in common use now is by the use of air maps. A contact aeroplane is assigned to a certain sized unit, usually about one per battalion or brigade, and it flies over low at prescribed times, say about once an hour. At these times it sounds a succession of " Gs " on its Klaxon horn, and the infantry light flares all along their front. The airman puts in the line on his map from these flares and after taking any visual messages sent, flies back and drops his information at a report centre. From here it very quickly gets to the artillery.

The subject of the best means of communication in assault has been covered so fully by so many experts that it will not be touched on here, except to say that it is one of the most important features of the assault, and if not properly arranged for beforehand will be very likely the cause of losing, when the counter-attack is launched, a lot, if not all, of the ground taken. Only too often the success of the entire operation depends on the quality of the information sent back. If an infantry officer hasn't a clear conception of this work, for his own sake and for the sake of his men, he should at once get some of the War Department publications on the subject. The information he will get from an hour's reading may very well mean the difference between success and failure in a few months' time.

In conclusion of this subject of coöperation, it is again stated that it is the infantry who receive the greatest benefits and whose very lives hang on it, and therefore they must not sit around and wait for the artillery to open negotiations, but must get up and start things. They should drop this banter at messes, that is so noticeable at present. While done only in fun, it tends to draw a line between the artillery officers and the infantry officers. In a mixed mess you will notice that one branch sits on one side of the table and the other branch on the other in a kind of mobilization for the battle of witty remarks that takes place at every meal.

This is wrong and, while apparently harmless in peace condition, may have serious results in battle. Get together. Both are helping toward one big result, the destruction of Germany.

CHAPTER VI

INFANTRY IN ATTACK

INFANTRY IN ATTACK AND NEW WAVE FORMATION

THE platoon is now the fighting unit and the success or failure of an operation often depends on the capacity of the junior officers to properly handle their men.

The platoon is a complete fighting unit within itself. It contains riflemen, bombers, auto riflemen, and rifle grenadiers. With this combination the platoon commander has under his hand all the different kinds of fire available to the Infantry.

The combination was first developed by the French, under General Nivelle, and was used with brilliant success during the great French counter-offensive at Verdun. The British at once adopted exactly the same tactics and demonstrated their soundness at the successful attacks of Arras, Vimy Ridge, Lens, Messines Ridge, and at the Battle of Flanders. In each of these attacks there were surprisingly few casualties compared to previous attacks and this was due, in great part, to the Infantry formation used and to the improvement in the Artillery barrage.

The new wave formation was developed so as to allow platoon commanders to meet the different contingencies that arise from being opposed by " Points of Resistance " in a trench-to-trench attack and in the semi-open warfare that is the secondary stage of an offensive. Waves have been used for quite a time, but until recently the main factor, that of having a percentage of each kind of specialist in each platoon, was overlooked. On the Somme, in the middle of 1916, the British had their trained specialists, but they were used as separate units, in each battalion, instead of being assigned to the platoons. As a result they went into action more or less as a body and when badly needed at any one spot were usually somewhere else where they were not needed at all. Under the present arrangement when a platoon commander wants any of his specialists they are right under his hand to be used as he sees fit.

When strong opposition develops the principle on which the platoon works is to envelope or surround the resistance and then to overcome it by a scientific and *simultaneous* use of all the weapons available to Infantry. In the case of a small resistance, usually one machine gun or a group of eight or ten determined riflemen, the first platoon to develop the fire starts an encircling movement at once and usually overcomes the resistance without the help of other units. The reinforcing platoons can often pass and " carry on " with the attack, leaving the troublesome point invested by the original platoon to find it. In the case of a larger resistance, such as a number of machine guns arranged checker-wise, or a large section of trench holding up part of the attack, companies, battalions, and even brigades may be used for the encircling movement, though the principle is the same. In the case of large encirclements it usually requires an operation order and further artillery treatment.

In order to obtain success it is first necessary to impress on officers and men that the primary advantage of this formation is its adaptability to sudden and unforeseen contingencies, its mobility and the scope it gives to the initiative of the platoon, section, squad and team leaders. In studying this formation it is necessary to free the mind from all parade-ground formations and to feel that there is nothing to hinder any desired movement that does not conflict with operation orders. There is no normal formation and the examples given later are simply suggestions that may be helpful to officers who have never seen a wave.

The term formation covers the arrangement, within the wave, of the different specialist sections and squads. This arrangement varies with the different forms of resistance met and the direction from which the enemy fire comes. The proper arrangement of the specialists is the key to success. Under this head of formations the resistance may be classified in two ways (*A*) Forecasted resistance. (*B*) Unexpected resistance.

Before an attack a careful study is made of the air photographs, of the ground to be captured, and every point picked out from which trouble may be expected. These points are then given extra artillery fire and knocked out of commission if possible. If it is found that the Artillery is unable to do the work completely the Infantry, on the front affected, is notified and they arrange their attack accordingly. When such a condition exists on a company front the company commander and his platoon leaders get together and arrange the waves so as to best meet the contingency. The platoon commander who actually has to capture the position should be allowed to decide how he wants to do it, the company commander only interfering where it is necessary to coöperate the work of the different platoons, and in the case of an obvious mistake in judgment on the part of the platoon commander. In the case of these forecasted resistances the platoon leaves its own trench all arranged to meet the first resistance.

As a rule the resistance met comes as a surprise, as this is the only kind that the Artillery does not usually put out of action beforehand. This is the time when the new formation justifies itself and allows of success with a minimum number of casualties. When advancing and a sudden burst of fire develops from an unexpected direction the platoon *must re-arrange itself under fire* and this requires perfect discipline and much previous training. The platoon commander must decide at once what he wants done and then get the men started. From this point on the men must know what to do without further orders, and the remainder of the fight is conducted by squad and team leaders. The officer may just as well pick up a rifle and get into action from a shell hole. Very often the " Point of

Resistance" will be just a plain trench junction. If the locality is strengthened to any degree this will become evident on an air photograph and the locality destroyed by artillery fire. In order to build a "strong point" that will not look strong the Germans often put in a system of good dugouts all around a junction of two trenches. This gives cover for a strong garrison on a small front. There is likely to be a machine gun or automatic rifle in one of the dugouts. If this or some riflemen can get out of the dugouts after our barrage has passed and before our Infantry arrives they can cause trouble. Sometimes these garrisons stay above ground and some live through the barrage, as no extra attention may be given to the place.

As a rule no wire will be around these points, as wire is a dead give away that something is being protected.

Before a platoon commander can hope to use his power to advantage he must know the uses and limitations of the weapons at his disposal. Briefly they are as follows:

(*a*) The auto rifles open up a point-blank fire on the "Point of Resistance," as soon as it is discovered, and continue to fire until the enemy fire is silenced or the riflemen are ready to make the final assault. The function of this weapon is to cover the movement of the remainder of the platoon, either by drawing the enemy fire or by silencing him with a direct hit or by forcing him to take cover. At the very least this auto-rifle fire will cause the enemy to take poor aim. It is very important that this fire be opened at once and from such a position that the line of fire will not interfere with the subsequent encirclement. One safe rule is that the instant enemy fire develops the auto rifles should jump, without waiting for orders, from whatever position they are in to the flank from which the enemy fire is coming. If they should open fire from the opposite flank the remainder of the platoon could not cross their line of fire. The work of this weapon might be compared to that of the Field Artillery in a barrage; they cover the movement of the Infantry across the open.

(*b*) The rifle grenadiers advance at once until within effective grenade range and then open up as rapid a fire as possible. They are particularly effective against a machine gun in a shell hole or in a trench with no overhead cover and can often with one well-placed shot end the entire opposition themselves. This section also covers the advance of the Infantry across the open and their work might be compared to that of the long-distance howitzers. These men should not all get in one shell hole, but should spread out fan wise, thus offering a more difficult target and also causing a greater demoralization of the enemy by having grenades coming from a number of directions at once.

(*c*) As soon as the enemy fire is drawn towards the auto rifle the bombers start their advance and by short rushes endeavor to get within bomb range of the enemy. If there are any old trenches leading in the proper direction they use these for cover, but care must be taken that all three bombing squads do not get into one trench and thus cut their throwing capacity down to that of just one squad. The ideal to be worked for is to finally get the three squads into such position that there will be bombs falling into the enemy position from three directions, front, flank and rear. The bombers may be compared to the short-range howitzers or the trench mortars.

(*d*) Under cover of the above bombardment the riflemen move forward and surround the enemy position so far as our own auto-rifle fire will allow. They should work up to within forty yards of the enemy and when all squads are ready start the rush. One squad starting is the signal for all squads to rush.

With all the sections working together and at proper ranges it is practically impossible for any resistance to last more than a few minutes. The secret of success lies in the training that allows all the squads to work together in mutual support. With a properly conducted encirclement, a machine gun in a position with overhead cover should be captured within about five minutes with a loss of about eight or ten men. In the fall of 1916, when this close coöperation between the different specialists was impossible, it usually cost the entire platoon to do this work, if one platoon could do the thing at all.

It is uncertain how far the men will have to advance under the fire from the " Point of Resistance." Sometimes the fire is almost point blank from the very beginning, but more often it is from a range of from 150 yards to 500 yards. In the former case the rifle grenadiers will be within range and can open fire at once; in the latter case they will have to go forward by rushes until they are close enough to open fire. When the enemy opens fire the men will take cover at once and then the encirclement will begin. The manner in which the advance is made is of vital importance and is based on the principle that as few men as possible be exposed at any one time and then remain exposed for only an instant. It must be remembered that a machine gun must be aimed and that an unaimed fire will do very little damage to a small body of men on the run. Using this knowledge it is possible to conduct the advance so that the enemy gunners will find it almost impossible to deliver any fire whatever on the rushing men. The thing to watch is that no more than four or five men are exposed at any one time, that these men get started in a hurry, travel fast for a very short distance (five to ten yards), and then get out of sight into shell holes as quickly as they appeared. The next team to move should be as near the opposite end of the line as possible. When the first team jumps up the enemy will try to lay his gun and fire, but before the fire can be delivered the team will be out of sight. At that moment another team jumps up off on the other flank. The gunner will swing his gun and again be fooled. It is very likely that the gunner will quickly become excited and his fire will become more erratic than ever. To watch a properly run attack on a strong point one would think that there were only about ten men in the attack instead of about sixty. The ability to work with this perfect coöperation between the sections and teams only comes after long and hard training, a training that is longer and harder than a man would think who has not been through it. It is difficult to get sections so trained that, even on the parade ground, they will be able to almost sense what the other sections are going to do, and it can be imagined how much more difficult it is to train them to do it under an intense and point-blank fire. It will not do to have two or three teams jumping up together simply because each did not know that the other was getting ready to move.

In training the platoon for offensive action the first step is to train the teams under their team leaders. This training gives the leaders the confidence necessary and gets the men accustomed to obeying the leader's voice, even if he is only a senior private. These exercises are very simple and consist of such training that will enable the team to act as a unit in action. It is fatal to have half a team jump up and advance and when the rush is about half over to have the remainder of the team try to catch up. The enemy gunners will, in this case, have the necessary time to take aim and the men caught will be hit to a man.

When the teams are properly trained the platoon is trained as a whole, first with a view to making them work together on the parade ground and then progressing to the practice of attacking the different kinds of opposition that may be met in an actual attack. The first exercises should deal only with forecasted resistance, in which the platoon is already arranged in the proper order, before leaving the trench, and then working up to training the men to get into the proper positions when an unexpected resistance is met. In each case situations must be assumed in which the resistance comes from the flank (right or left), from the centre or from both flanks at once, or just plain frontal resistance along the entire platoon frontage. Each of these drills must be practised over and over, twenty or thirty times, until the men know just what to do, *without orders.*

Before giving examples of how the platoon may be arranged to meet the different forms of resistance it is necessary to explain in some detail the term wave, and to show how these waves are made up. In mentioning battalions and platoons the American unit is meant. As most commonly understood, the term wave means two lines of men with a distance of 15 to 25 yards between lines and an interval of about 5 yards between men. The length of the wave may be up to twenty miles. See Fig. 10 for one of the ways that a battalion may be formed up for an attack. There are any number of ways this may be done, but the one example is sufficient to give a mental picture of a series of waves. In this case, which is rather typical, the battalion is going over on what is known as a two-company frontage, in three waves of two lines each, followed by three lines of "moppers up." By looking at the sketch this apparently complicated phraseology explains itself.

It will be noticed that a platoon is in two lines and forms a complete part of one of the waves. Another point to be noticed is that the company is arranged in depth and that only three platoons per company are shown. The fourth platoon is usually left at the transport lines to form a base on which to build up a new battalion, or, as often happens, the fourth platoon is used to bring the other three up to full strength. Part of No. 3 company is used to form " moppers up " for No. 1 company and the remainder forms carrying parties (ammunition, wire, food, water, etc.). No. 4 company acts in the same way for No. 2 company. The "moppers up" should be about one-quarter the strength of the wave they are mopping up for. Following the waves are usually other troops in artillery formation who act as reinforcements and who are detailed to capture more distant objectives. After they pass through the forward troops they take up the wave formation.

There are two methods of attack employed for a series of waves, (*a*) the leading wave stops at the first objective and consolidates while the remaining waves pass on to the other objectives. This is known as the " leap frog " method. (*b*) The leading wave continues on to the final objective. The objection to the former is that it is liable to get the units mixed up, as it is difficult to make men stop in a trench when they see their friends going on. The objection to the latter method is that it causes the leading platoon to suffer the most casualties, for it will have to capture all the objectives and simply turn them over to the platoons following. Regardless of this disadvantage it is the latter method that is usually employed for the first two objectives.

The following are suggestions for the arrangement of platoons to meet some of the different kinds of resistance that may be met. It is assumed that these resistances have been forecasted and that it is thus possible to arrange the platoon before starting. The only difference in meeting the unexpected resistance lies in the fact that instead of making these arrangements under cover of a trench they will have to be made in the open, under heavy fire and will have to be done in a hurry with few or no orders. The men should know just as well as the officer what should be done. If they don't know, the officer has not properly trained them.

These examples are given more with a view to illustrating how the different specialists work together than with any idea of establishing a rule to be followed. That is the reason that no endeavor has been made to cover more than a few simple cases. There are never two resistances exactly alike and in each case the men on the ground have to act according to the local conditions; but if a thorough understanding of the principles involved is grasped there should be no difficulty in deciding what to do in any given emergency.

EXAMPLE 1 (see Fig. 11).—In this case a resistance is expected at " R " and in order to meet it the platoon might be arranged about as in Fig. 12. It must be remembered that there are platoons on either flank and practically unlimited support from the rear. It must be assumed that trench X will offer no resistance at all and that "R" is the only point in trench Y where there will be any enemy. If resistance were met all along Y it would be too big a matter to handle with one platoon and a much larger operation would develop.

Points to be noted are:

1. The auto rifles are on the flank nearest "R" and their fire will not interfere with the other sections.

2. Bayonet men are placed on each flank of the auto-rifle unit so that they can protect the guns from any Germans emerging from dugouts.

3. Bombing teams are working towards "R" from front, flank and rear.

4. These bombing teams are so arranged in the wave that they can lead out from the left and be in the proper order—bayonetman, thrower, carrier and N.C.O.

5. The bombing teams are in the first line so that they can get into position before the riflemen and by their fire cover the riflemen moving across the open. The bombers will have cover and not need as much fire protection as the riflemen.

6. The rifle grenadiers are placed on the right of the second line so that they will not have to cross the path of the riflemen and also because it is more or less of a general rule to never place the grenadiers in the first line. They have a shorter distance to go than any other section except the auto rifles and if in the first line would lose their main advantage, that of firing over the heads of other troops.

7. Scouts are placed as shown so that they can proceed down the trenches captured and get in touch with the platoons on the flanks.

8. Sergeants are placed about two paces behind the centre of their sections. They can see best from this position the action of their section.

9. A space should be left in the line in front of these Sergeants and one behind the platoon commander, for otherwise it will appear to the enemy that there is a "bunch" at these points and they will be the first target for fire. From the front it is not noticeable that one or two men are a few paces ahead of or behind the line.

10. The platoon would probably come under fire of "R" just after it had climbed out of trench X. The men would go down on their faces and disappear into shell holes at once, and then start their little rushes from hole to hole as explained before. The officer has very likely not given a command, or may be a casualty.

11. When every team is in position about as in the sketch one rifle team will start the rush with the bayonet. This is the signal for all the riflemen to rush. It is a good idea to have it arranged that the team that has the furthest to go, in this case No. 1 Section, starts the charge. About the time the riflemen are getting ready to rush it is not uncommon for the resistance to cease, either because some of the specialists have registered a hit or because the enemy sees that he will be killed if the rush ever starts.

12. After "R" is captured the platoon reforms and proceeds to the objective beyond and there joins in the consolidation.

13. When the platoon is encircling "R" the platoons in rear will very likely pass on around to the flanks and leave the first platoon to handle the problem.

If the resistance develops on the left flank the arrangement of the wave is just the reverse of the one shown, and the encirclement goes to the right instead of the left.

Example 2 (see Figs. 13 and 14).—In this case "R" is in the centre of the platoon frontage. The encirclement may either be made around either flank (if necessary overlapping into the frontage of the platoon on that flank) or it may be made around both flanks as shown in Fig. 14. The method decided upon would depend a good deal on local conditions. If one flank offered better cover the men would naturally go that way. If the cover was about equal half would probably go each way. The question of what would offer the best position for the auto rifle must be considered. The final decision will probably be arrived at after a careful study of the maps, air photographs and the probable action of the platoons on the flanks. In most cases the answer will more or less suggest itself when all the data is in front of the platoon commander.

As examples of the flank encirclement have been given, Figs. 13 and 14 deal with the simultaneous encirclement on both flanks. The same principles are employed in this case as before and the drawings explain themselves. One of the important things to notice is that the arrangement of the specialists in Fig. 14 is different than in Fig. 12. This illustrates the important fact that for different forms of resistance different formations are used. It is not impossible that every platoon in a battalion will go over with a totally different formation from any other. In this drawing there are no trenches for cover, so the auto rifle simply takes cover in a shell hole and all movement is over the open.

In the foregoing examples no mention has been made of the moppers up. They are not really part of the platoon and unless urgently needed do not take active part in the capture. They simply take over a position after it is captured, picket dugouts and force the surrender of any Germans left alive. Their main function is to prevent any enemy emerging from underground after a wave has passed and then firing into the backs of our men. They are fully equipped, though, and if needed can be used in the actual assault. After moppers up have completed their work they usually move forward and reinforce the garrison in the final objective. Not only are moppers up detailed for the fire trenches, but certain ones are detailed to handle the communication trenches. Often there are as many dugouts in these communication trenches as in any others.

EXAMPLE 3 (see Fig. 15).—In this case the resistance is too large for one platoon to handle, and indicates how a supporting platoon may have to be employed. The resistance is composed of a section of trench and a communication trench converted into a fire trench. This converted communication trench may extend further back and in that case it would simply take more of the supports to do the work. The company on the left would probably encircle to the left or might deliver a frontal holding fire.

As each platoon comes under the fire of "R" it will automatically take cover and start moving for its ultimate position by short team rushes just as in the single platoon encirclement. The men must have been trained for this case too, for it is too late when trouble begins to call your team leaders to you and tell them where to go. They must know and every man must know, just as well as the officers, just where to go and what to do. Their *exact* distribution in a case like this is not so important as getting some kind of distribution. The point is to get around the enemy and to face him in the shortest time with absolutely no hesitation or confusion. This requires previous training. Some platoon commanders may have their teams line up in one order and other commanders may like some other order, but be certain to have a definite formation decided upon for this and every other form of resistance you can think of and that all of these formations are understood by all of the men. The platoon that does something smoothly and with confidence, even if it is the apparently wrong thing will very likely succeed, while the platoon that does the right thing with confusion and uncertainty will probably lose out with heavy casualties. Team work is what counts and not tactics. You don't have to be Napoleons if your men work together and believe in you and themselves. The officer with just plain common sense and a well trained unit is much better off than a really brilliant officer who has neglected his team training while thinking out fancy plays. Success hinges on getting close to the enemy, getting there quickly with no confusion and every man knowing perfectly what he and every other man in the platoon is trying to do.

As the second wave comes under fire, they will take cover just like the first wave, and apparently disappear into the ground. They will then cross the danger zone behind the first wave by team rushes and get into a position something like shown in the sketch. The third wave can also cross the bad stretch by team rushes and if not needed can reform wave when they have passed "R" and then continue on to the objective, leaving "R" invested by the first two waves. If there is any reasonable doubt as to the ability of the first two waves handling "R" the third wave should help out either by reinforcing or by joining on to the second wave and making a more complete encirclement. In a case of this kind the reinforcing troops following in rear, in artillery formation, can form waves and "carry on" with the attack. As soon as the resistance has been overcome either by the combined fire of the platoons or by the bayonet, the platoons reform and proceed to their original objective. The men should be trained in this reforming also.

The three examples just given are sufficient to give a clear conception of the general principles involved and to give a mental picture of a wave and its composition. That is all the assistance that can be given anyone. More details might make a beginner feel tied to a certain form of action which would be bad. Each officer should think out his own scheme and then take great pride and pleasure in making his men perfect. It must be perfection that is attained, anything short of absolute perfection in team work means that you and your men will very likely die in a short time. This perfection is the best form of life insurance ever devised and is easy to attain if you first decide exactly what you are going to teach the men before you try to train them.

Before starting this training rehearse to yourself exactly what you are going to tell the men during the drill. Talk to them, but be certain you have studied over what you are going to tell them. Remember that when the fight starts you lose control and that it is the private's knowledge that is going to be used and not yours. You must give this private his knowledge so make it your ideal to be certain that every man in the platoon is in possession of *all* of your knowledge and in this way some important piece of information won't go to waste with you when you pick out a nice comfortable shell hole to crawl into.

The following is a sequence of events that is more or less typical of what a battalion of Infantry might expect to go through, just prior to and during an attack. (The attack is to be successful and in the first stage of an offensive, being made from a well-organized system of trenches against a highly developed defensive position.)

1. About a month previous to zero day the battalion will be ordered to move into the back country behind the front to be attacked. They will probably find that a large number of hutment villages have been put up to accommodate the extra concentration of troops. These huts will be about five miles behind the front line and protected as far as possible, from enemy observation, by woods, hills, protective colors, etc. If we have command of the air there will be very little fire directed on these huts, but if the enemy has the air control a number of casualties can be expected all through the back area. While in this position the equipment of the unit is very carefully checked up and any disorganization caused by recent drafts straightened out.

2. About three weeks previous to the attack reconnaissance parties of officers will be sent up to the front from which the battalion is going to attack.

3. A couple of days later the battalion will move into its front for a stay of about a week. During this time every officer and man must become perfectly familiar with the entire system of trenches he is in and also study the ground that the advance is to be made over. Every officer should be taken by the battalion Intelligence Officer to the different observation posts and be shown the front he will go over and the

location of his objectives and dangerous points on his frontage, places where halts will be made, places where the ground offers cover, etc. During this time each officer will be given a complete set of say twenty-five air photographs and from these, the ordnance maps, and his personal observation under the Intelligence Officer he should be able to form a very good estimate of the situation. The battalion intelligence section also makes a very thorough examination of No Man's Land and the condition of the enemy wire. Particular care must be taken to be absolutely certain that there are no old trenches in the middle of No Man's Land that are full of wire and would hold up the attack at the very beginning. During this last stay in the line it must be ascertained that the departure parallels are in good condition, and that every other detail is in good working order. It is a bad policy to leave this work to the battalion that is going to relieve you, for they will not be in the front on the day of the fight and are not liable to take the same interest in the work as you are. If time permits it is a good idea to place the battalion in the departure trenches that they will use. This will help to prevent confusion when the unit takes up its position just before the attack. All officers and as many men as possible should be shown the position and best routes to the following: Advanced Brigade Headquarters, Advanced Dressing Stations, Advanced Report Centres, Advanced Ammunition and Supply Dumps, Prisoner Cages, etc. This information will be of immense benefit during and just after the attack.

4. Before going out of the line the battalion will very likely have to send over a raid to establish the identity of the German unit opposite and to discover what the enemy barrage lines are. This latter is a very valuable piece of information, and if carefully observed and the barrage lines plotted, much of the enemy artillery fire may be dodged on the day of the attack. Trenches that the enemy covers with a barrage should not be used for "jumping off" trenches if it can be avoided, unless it is practically certain that the majority of the enemy guns have been put out of action during the last few days before the assault. If a number of raids are sent over at the same time and on an extended front the enemy will think that the real attack is on and display practically his entire artillery strength.

5. After the raid the battalion will move out of the line and go well to the rear, say twelve miles, and put in the remainder of the time in the last intensive training. The time allotted for this work will be from ten days to two weeks. The unit will probably be billetted in an old town. Soon after arriving at their billets the operation orders will be issued. These orders go into the most minute details and with the numerous amendments and additions make quite a large bundle of documents. As only a certain portion of this mass of information will apply to each unit it will not be necessary to memorize the entire thing, though it will be necessary to study it all so as to get a comprehensive idea of the entire operation. The

part applying to each officer or man must be memorized until even under the most intense fire every detail can be recalled, and a regular picture of the page in question can be visualized, down to the very commas. As a rule the battalion will find a set of trenches dug (about one or two feet deep) that is an exact duplicate of the German trenches to be attacked. If not already dug the unit does this work at once and begins to practice the attack in all its details. The platoon commander arranges his platoon, along the lines explained before, and then shows each and every man just exactly what he has to do at each objective. Each man goes over with the knowledge of what his work is and even if all his officers and non-commissioned officers are killed or wounded he still can go right ahead and do his little part. Each man should be trained so, that all the time he is advancing he is sort of subconsciously repeating to himself something of this nature: " In sixteen minutes I must be in the Black Objective and drop a bomb into the first dugout to the right of Emperor Avenue and then, etc., etc." When the men go over trained like this nothing can stop them and there is no confusion or uncertainty as to what is to be done. This assigning of certain duties to each man gives him a sense of personal responsibility and cultivates an intense desire not to fail in the special work assigned to him. This sense of responsibility will make a man " carry on " when his plain courage alone might fail him. The more responsibility a man has on his shoulders the less he will worry about his own safety.

The training starts with each platoon working over its own frontage, then the company works as a whole, then the battalion, and finally the brigade. During the rehearsals of the larger units the barrage is usually indicated in some manner, such as having mounted men moving forward with flags. It is a very good idea at these final drills to have the aeroplanes, that will work with the unit in the attack, actually fly over the troops and take the messages, etc., that will have to be sent during the real fight. This gets both the Infantry and the air service used to this kind of work and adds to that perfection that is so necessary if success is to be expected.

The men should not be overworked and must be kept in the best of spirits. They will need all their physical strength and cheerfulness when they finally go over. Just before going back to the line, to go over, it is a good idea to take extra precautions that all the personal belongings, that are not to be carried, are plainly marked with the owner's name and unit so that if he is killed or wounded his effects stand some chance of getting sent home. An officer should make his arrangements on the assumption that he is going to be wounded and take with him what he is most liable to need in hospital (extra smoking materials for certain). His servant should also be instructed in exactly what to do with the kit, when he hears that the officer is wounded. Often with a good servant an officer will find his kit waiting for him at the Casualty Clearing Station and can thus take it along with him on the hospital train.

In order to get the men used to what a barrage fire looks like there have been cases where a full intensity barrage has been put on, before the men come out of the line for their training. During this barrage the men can look over the parapet with more or less impunity, for the Germans will be too busy getting into dugouts to do much sniping. If the ammunition supply warrants this display it is a very good thing, for the men will know what kind of protection they are going to have and will also not be so startled when then have to move forward under their barrage. There have been numerous cases where men have thought they were under a heavy German artillery fire because of the noise, when there were no German shells arriving at all. If a man has seen an intense barrage he is not so likely to be fooled and more likely to keep his head.

6. About 12 to 24 hours before the attack the battalion moves into the line and makes all the final arrangements. Before going up to the line every one gets his full supply of ammunition, bombs, iron rations, water, etc., and has strict orders not to use any of them before the attack. Rations and water for the time in the line are brought up as usual. There will be very heavy shelling during these last few hours, as our guns will have been putting up an intensive bombardment for the past week or two and the Germans will have moved in more guns and will be doing their best to discourage any attack before it even starts. For this reason it is best not to move attacking troops into the

line a minute before it is necessary; besides this, it is very trying to have to stand around and wait for the time to go over. While out of the line the coming attack seems more or less of a bad dream, but when you have actually moved in for the last time it becomes a very real affair and there should be no more waiting around than is necessary.

During the last few minutes the officers should avoid all those signs of nervousness that are so bad for the men to see. It is very common to see officers who are unable to stand still, are continually looking at their watches, giving hurried last-minute instructions, etc. All this has a bad effect on the men. It is a good idea to just walk the length of your line and try to be as natural as if you were simply making your nightly inspection of the front line. There is no need to try and crack jokes with the men, not one officer in a thousand can do it and laugh without some strain showing. A simple, quiet and dignified bearing will do wonders for you and your men. If you see a very bad case of funk talk to the man for a few minutes and try to show him that he has at last a man's size job to do and that it is much better to do it in a way that he will afterwards be proud of than in a way he will always be ashamed of. If you are O. K. yourself you can make even the worst cases of funk wake up and play the game. An officer has so much responsibility and so many things to think about that it is comparatively easy for him to forget his personal worries and he must remember that his men have not got this assistance and that they will look to him for their inspiration and example.

Just before zero hour, say ten minutes, there is very likely to be a decided lull in the artillery fire. This is caused by our guns being stopped to allow cooling and for them to relay on the barrage lines, and to get everything arranged for the big show. About this time the men will be getting up and giving a final arrangement to their equipment, looking over their guns, bombs, etc. It is a good thing for officers to get out their revolvers and see that the chamber is loaded. There have been numerous cases where, due to thinking of other details, officers have forgotten to draw their guns at all and have actually arrived at the German parapet with no weapon in their hand and even the chamber, of the gun in holster, not loaded. This may lead to disastrous results.

7. When zero hour at last arrives usually the first thing to happen is a sudden and violent increase in our artillery fire and the roar of innumerable machine guns opening up. This in conjunction with the officers' watches is the signal for the attack to commence. First a line of junior officers appear on the parapet and then wave after wave scramble out after them. The officers should not do this, for it leads to heavy officer casualties, but the effect on the men makes the loss almost, if not quite, worth while. It is much easier to get good results by saying " follow me " than by saying, " over you go." After the attack has once gotten good and started the officers can get into their proper places.

In this first start it is advisable to get all the different waves out into " No Man's Land " as quickly as possible, and in this way dodge the enemy barrage that will shortly fall on the old front line. Very often all the waves start out together and then sort out in No Man's Land by having the first wave move ahead and the others kneel until the proper distance has been gained. No one should be allowed to lie down, as it may be hard to get them up again.

With the intense bombardment that is now given the German lines, before the troops go over, there is seldom any serious resistance met at the very beginning of an offensive. A battalion can expect to cross " No Man's Land " and capture the enemy front line with practically no casualties.

There are really two barrages during an attack (*a*) the creeping barrage, (*b*) the capping or standing barrage. The former is made up of the field gun and small calibre howitzer shells. In other words it is formed by the Divisional Field Artillery. The guns usually fire at a rate of about four rounds per gun per minute. The rate at which this barrage moves forward is determined by the estimated rate at which the Infantry will be able to move and varies with the nature of the ground and the opposition anticipated. Over solid ground, in daylight, the barrage may move at the rate of 100 yards per 2 minutes. Over muddy, shell-torn ground the barrage may advance at the rate of 100 yards per 4 minutes. The pace of the barrage is *not* a fixed quantity throughout the entire attack. It may start off at one pace and then change every few hundred yards, as the nature of the ground changes. When making up an Artillery time table the main factor considered is the rate that the Infantry can move forward. After the attack has once started the rate of the barrage can not be changed and from that time the Infantry must keep up to their barrage at all costs. If once lost it is impossible to call the barrage back, and the attack will probably fail with heavy losses. The object of this creeping barrage is to drive the enemy into dugouts, demoralize him and thus prevent him from delivering a point-blank fire on our men advancing in the open. This creeping barrage creeps over all the ground between the enemy lines so as to put out of action any machine guns or bombers out in shell holes between these lines. If the waves are close enough to the barrage, say 100 yards, they will be able to get into the German trench before the enemy can man his parapet and open fire. The secret of success is to follow the barrage just as close as possible and this distance is correct when some few men in the first wave are being hit by their own artillery. It is much better to lose a few men this way than to lose a great many more and maybe fail altogether by allowing an enemy machine gun to get started.

The standing or capping barrage is made up of all the other guns and is in reality the main part of the fire. The guns delivering this bombardment are laid on all the points in the vicinity that may prove at all dangerous. All important trench junctions are covered, all suspected headquarters, emplacements, dumps, observation posts, signal posts, etc., etc. This fire destroys all enemy communications, prevents reinforcements coming up trenches, destroys most of the enemy guns, and practically paralyzes the enemy for the time being. The time table for this barrage is so arranged that the guns will cease fire on targets as the Infantry come close to them and will then change to another target.

In addition to the Artillery creeping barrage there is usually a machine-gun creeping barrage that opens at zero and moves along ahead of the Infantry at the same rate that the Artillery does, but keeping about 400 yards ahead of the first wave or more correctly keeping 300 yards in front of the Artillery barrage. These machine guns greatly add to the demoralization of the enemy and also prevent his reinforcements coming up over the open or his garrison escaping the same way. The gun fire on the trench junctions prevents this same movement in the trenches.

One of the lessons learned at the cost of thousands of lives is that it is better to have the barrage moving too slowly than too fast and that the Infantry must keep up close behind or they are lost. Even if their barrage kills a few of them it is still the best friend they have and their only hope of not being slaughtered.

To return to the waves just starting out across " No Man's Land." As mentioned before, they will not be likely to receive very much fire as they cross this piece of ground. The enemy front line wire will be almost completely destroyed and so no trouble is anticipated there. The wire may not be totally destroyed and blown off the face of the earth, but there will be so many holes that it is a regular sieve that the waves can pass through with no trouble.

The last ten or so yards should be done at a rush. When arriving on the enemy parapet don't stop! Jump in with your bayonet out in front. The man who hesitates here is lost, if there happens to be a fighting German in front of him. Nothing is easier than to put a bullet into a man who is standing still on a parapet, a few feet away, and nothing is harder than to withstand a man coming flying through the air preceded by a bayonet, and with murder in his eye. The Hun will usually put up his hands in this case, and no better target for a bayonet can be asked for.

Very few men will be fortunate enough to finish off a Hun at this stage of the fight. Any enemy present will probably be underground and will be dealt with later with mobile charges and bombs. This is the " moppers up " business. As soon as the trench is cleared the wave reforms, with no delay, on the far side and continues its walk. It must be remembered the barrage isn't waiting while you indulge in fancy bayonet work in a trench.

Before going further it must be stated that this is a *successful* attack, that is being described. If the attack is a failure all rules are off and there is no telling what may happen. The only thing to do is to hold on to all the ground your own courage and the Germans will let you hold. Every little piece of ground held means just that much less distance for the next attack to go. Just as in a football game, a few yards gained at the very kick-off may later mean the difference between a touchdown or no touchdown.

After leaving the first trench the resistance is likely to become stiffer and stiffer until the German main line of resistance is reached (see Fig. 16). Fig. 16 is given as an example of what might be the different objectives on a Regimental Sector. Three battalions are here shown on the sector, maybe only two battalions per regiment would go over, but this sketch will help to get the picture of the conditions. No attempt has been made to put in details like advanced headquarters, signal stations, barrage lines, etc. The idea to be grasped is how the units go straight ahead on narrow fronts. Of course there will be other Regiments, Divisions and probably Corps on each flank. The main line of resistance may be from the third to fifth trench. Sometimes the troops halt about two hundred yards in front of this trench and give our artillery about one-half an hour to put on the finishing touches to its bombardment. This halt would be made where the men would be under natural cover and gives an opportunity to get reorganized and reinforced before the real fight takes place. The position for this halt would probably be called the first objective, the front line system not being regarded an objective.

When the time comes the Infantry moves forward again and endeavors to capture the main German line.

This line will probably be called the second objective and may be about 1800 yards in rear of the enemy old front line. The first three waves will probably stop just beyond this line and dig in while the troops following, in rear, in Artillery Formation will pass through, form waves and go on to a third objective and consolidate.

There will be numerous small fights going on at this time between platoons and encircled points of resistance, but they can be left more or less to themselves. As soon as the attackers reach their final objective they signal back the fact to the Artillery by rocket. The barrage is then laid down between 200 and 300 yards in advance and kept going until the consolidation is well under way.

On reaching this final objective battle patrols are at once sent out to get in touch with the enemy and to seize and hold any vantage point. It is often possible to occupy a point at this time without a fight that might well require a small battle to capture the next day.

The auto rifles are pushed out well in advance, say 100 yards, and they get into shell holes and cover the men digging the trench behind them. The auto rifle team should have two trained bayonet men as part of its makeup, so that at this time it can go out as a self-contained unit and not have to stop and borrow bayonet men from other teams. The shell holes occupied by these guns are improved as much as possible and the different shell holes are joined by a trench. This line of joined shell holes is then connected to the trench in rear by communication trenches. Thus the main body is really digging what is destined to be a close support line, while the advanced covering teams are digging our new front line.

A thing of vital importance is to get up some wire at once, before the deliberate counter attack comes. This may happen any time after one-half hour. Before this time there may be numerous purely local and disjointed counter attacks that should be easily handled by our advanced auto rifles. It is a good policy not to call for S.O.S. fire from the Artillery for these half-hearted affairs, but to reserve your gun fire for the real counter effort. Otherwise you may wear out your artillery men and use up your ammunition before the real test comes.

The deliberate counter-attack will very likely be preceded by an intense bombardment, by the enemy, and the men must be underground before this. When the attack develops it ought to be easily stopped by our Artillery, auto rifles, Stokes guns, bombs, or the bayonet, if necessary. A little wire out front makes every one feel better at this time.

There are so many activities going on at the same time that for a book of this size it is impossible to more than mention them. Very soon after an attack the whole back area is simply alive with moving figures. The wounded are being carried out by specially detailed stretcher bearers. The ordinary complement is not anything near enough, so sometimes whole units of reserve troops volunteer or are detailed for this work. There have been cases where cavalrymen have been utilized for this. The trained stretcher bearers with the Infantry are used to do nothing but bandaging. Besides this work there are carrying parties moving up to the new line with supplies, ammunition, bombs, food, water, wire, revetting material, etc. Brigade machine gun companies are moving up to man new "strong points" and Engineers are going up to put in these "strong points" just behind the front line. Signalers are laying buried cables and surface lines, artillery is moving forward, etc., etc. Each man has a special job and is plugging ahead to do it regardless of the curtains of fire the enemy will now have established. The enemy may have had this curtain fire established when the original attackers went over, but more likely he was so uncertain of how matters stood, up front, that his guns could only pound away at our old front line that had been left behind.

ESTABLISHMENT OF A DEFENSIVE FLANK.—Before leaving this subject of attack it is necessary to briefly describe the use of a platoon in establishing a permanent block in a trench, part of which you hold and part of which the enemy still holds. The idea in this case is to prevent an enemy bombing party from working down the trench and annoying our garrison (see Fig. 17).

Suppose A-A is the left flank of the attack and from A-A to the left is held by the enemy. To put in a block here, in a hurry, a platoon could be used to advantage.

The auto rifles will take a position in shell holes about as shown and, assisted by the rifle grenadiers, will cover the bombers who will work down the trench. The auto rifles will prevent any enemy from interfering, across the open. The rifle grenadiers can drop grenades ahead of the bombers and be of the greatest assistance. When engaged with a hostile bombing party and barely holding your own, with heavy casualties, it is practically unbearable to have rifle grenades dropping in rear of you and to be unable to reach the grenadiers in any way.

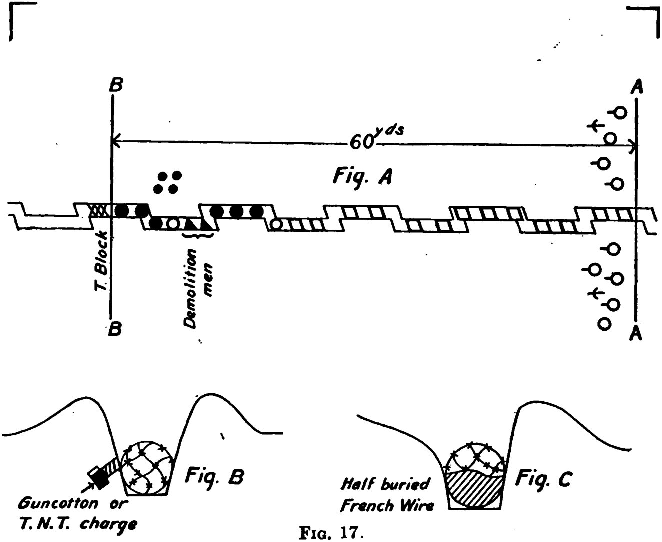


FIG. 17.

If the ground will allow, one team of bombers can work in the open along the parapet. This makes for much faster clearing of the trench, but is often impossible, due to the rifle or auto rifle fire they would draw in an attack of this kind. The enemy will be very much awake at this junction and will have massed bombers, auto riflemen, etc.

The trench will be cleared for about 60 yards, say to B-B, where the bombers will put in a temporary block and hold the enemy off for a few minutes. During this pause each man in rear will scoop out a little excavation as shown in No. 2. This need only be a foot or so deep.

The second bombing team carry extra bombs and a number of one-pound slabs of gun cotton or T. N. T., all fixed with fuses and primers. The leading riflemen carry rolls of French accordion *barbed* wire.

With the leading bombers are two men trained in demolition. When the excavations are done the leading bombers attach one end of a roll of wire to their temporary block and then retreat, stretching the roll out after them. One roll will stretch 15 or 20 yards. The two demolition men then put gun cotton in the excavations in the part of the trench where the wire is stretched, tamp the charge and start the fuses burning.

The idea is to put in just enough explosive to cave in the trench as shown in No. 3. This half buries the wire, holds it firmly in position and makes an absolutely impassable barrier. Usually about one pound of gun cotton per three yards will do the work, though, of course, this varies with different kinds of earth.

This whole operation can be completed in a very few moments and is absolutely efficient in keeping the enemy from using the trench. It would take entirely too long to shovel in the whole trench, besides exposing the men. Sandbag blocks are temporary at the best and must be held by bombers. If these bombers are out-bombed the block is captured. With a block as above described, to all intents and purposes there is no trench for the Germans to use. It will be much easier for them if they try to come over the open. If men or material are short, sections of the trench, say every ten or twenty yards, only, need be blocked. This will make the enemy come up into the open at these points and this, although not as efficient as the entire block, will make it nearly impossible for him to get close enough for bomb work. Our auto rifles will be trained on these places.

The question will arise as to how the platoon will have the necessary material for this work. In most cases where this permanent block is needed it will be on the extreme flank of an offensive and a platoon will be previously detailed for this work alone and thus make arrangements beforehand. From this point, in the most advanced line captured, a defensive flank trench will probably be dug back to our old front line. Every trench this flank trench crosses, on the way back, will have to be blocked. In a big attack an entire Brigade, even Division, may be used to establish this defensive flank.

RAPID CLEARING OF A COMMUNICATION TRENCH.—During an attack a number of enemy communication trenches will probably be in your frontage. The waves will advance along each side of these and they must be captured as you go. There are often dugouts in them. These may have a number of Germans in them who will get out and fire into your back. About the best way to handle this is to turn the trenches over to your bombing teams and let them clear the trench, as was described in the chapter on "Raids." Have one team in the trench and one outside. These teams must keep up with the waves which must keep going so as not to lose the barrage. Sentries can be posted at dugout entrances to guard them until the "moppers up" come along, or mobile charges can be put down, or a couple of "P" bombs thrown in. These "P" bombs are cans of phosphorus that explode and throw chunks of white-hot phosphorus around. This sets fire to wood work, burns men badly and the fumes make it impossible to stay in the dugout. When the enemy emerge they won't have any fight left in them, for they will be choking, practically blinded, probably badly burnt and certainly very sick at the stomach. A "P" bomb is small, about twice as large as a Mills No. 5, and not much heavier and is very efficient where it is impracticable to carry the much heavier and more bulky mobile charge.

When you have read this far go back to the beginning of this chapter and study again the principles of the wave formation. Don't let any of the later narrative take your mind off of these principles. They are the most vital thing you must know and their foundation is perfection in the work of the small teams. The way in which these small teams work together is the basis on which the success or the failure of the army may hang.

CHAPTER VII

TRENCH ROUTINE

Relief of Trenches.—Note: The details in the following chapter differ in nearly all armies and are even different in numerous units of the same army. This is written to give a general idea of one method that has worked successfully. By comparison with other methods or by original changes a better method could be worked up, but the example given is the best that the author has come in contact with, and may serve as a foundation from which to develop a better scheme.

Before taking over a new set of trenches each Company should send up a party (suggested strength, Company Commander, 1 representative from each platoon and 1 Company runner) to stay in the trenches, with the Company being relieved, for twenty-four hours. At the same time the Battalion Headquarters should send up representatives, say the Adjutant, Battalion Sergeant Major, and three or four runners. This party will gain the following information:

1. Stokes Gun Emplacements.
2. Heavy Trench-mortar Emplacements.
3. Medium Trench-mortar Emplacements.
4. Grenade Depots and Approximate Number of Bombs.

5. Dugout Accommodation.
6. State of Own and Enemy's Wire.
7. Communication Trenches.
8. Listening Posts.
9. Dressing Stations.
10. Reserve Rations.
11. Reserve Small Arms Ammunition.
12. Reserve Signal Lights, Rockets, Etc.
13. Ration Dumps (Where Transport has to Stop).
14. Where Water is Obtained.
15. Engineer Dumps.
16. Disposition of Present Garrison.
17. Observation, Machine-gun and Snipers' Posts.
18. Points Where Work is Urgently Required to Strengthen Position.
19. Distance of Enemy's Trenches from Ours.
20. Where Enemy Mining is Suspected.
21. Danger Places in Our Line from Sniping, Machine-gun, Trench-mortar or Artillery Fire.
22. General Attitude of Enemy.
23. Best Cover in Case of Shelling.
24. Various Means of Communication; who you have telephone communication with and whether the lines are in good condition, how to connect with companies on your right or left, method of getting your artillery, whether direct line or not, your S. O. S. signal, and the various routes to the different headquarters.
25. Barrage and S. O. S. lines of the guns covering you, number and approximate location of the guns.

A copy of the above is usually given to the men going up and they make notes and sketches of their own company frontage, which are handed in to the battalion commander, who has the intelligence officer draw from them a rough sketch of the front. Copies are then given to the officers.

On the day of the relief the usual procedure is for each company to send up an advance party (usually the First Sergeant and one man) to take over all trench stores and to sign for them (periscopes and Very pistols are not trench stores and are taken out by the outgoing battalions).

If the relief takes place at night it is a good idea to send up the first relief of the listening posts, as this will save time when the actual relief takes place.

In different battalions different customs are in force as to the method of the actual relief, but the following is a more or less typical method:

The incoming company forms up at its billets and then each platoon moves off separately by the routes previously described in the operation orders. Certain trenches are reserved, by Brigade, for upgoing troops and certain ones for outgoing troops. As a rule all the upgoing troops use the same communication trench, but are at about 200 yards distance. The leading platoons should be the ones that are going to relieve the front line. The usual order of relief is from right to left. Flank platoons should be relieved first, if possible.

At a prearranged point the incoming platoons are met by guides sent by the outgoing troops, and conducted by them to the right flank of the platoon to be relieved. No unit being relieved can go out until troops from the rear take their places. All relief is from rear to front. The outgoing platoon will be "standing to" and the incoming platoon will come along in file from the right flank. The officer will be leading and when he comes to a post to be relieved will simply put an equal number of his men in position and tell the outgoing men to move off ahead of him. As he goes along there will be fewer and fewer men behind him and more and more in front, until all his platoon is posted and the entire outgoing platoon will be ahead of him and ready to go out whatever communication trench has been agreed upon. This relief may take place day or night, as the nature of the approaches, from the billets, demand. A relief is always made by daylight when possible. If the relief takes place at night the listening posts should be the first posts to be relieved. Platoon and section commanders will now get any further information that they can. When everything is in order the two platoon commanders proceed to company headquarters and report the completion of their relief. When all the platoon officers have thus reported, the Company Commanders report the fact to their respective Adjutants by telephone, being careful to use a code word. If the enemy get information that a relief is taking place there is bound to be trouble, as the Artillery will be turned on at once, and there will be heavy casualties in the crowded trenches.

As soon as the platoons going into the support line have gotten into their dugouts and had a chance to remove their equipment they are detailed for the necessary ration parties.

The Company Commander, as soon as he arrives in the trench, proceeds to the headquarters and there gets any information possible from the outgoing Company Commander. He also takes over the log book and all maps and air photographs.

When the sentries, in the front line, have been posted and their positions have been checked and arranged to the satisfaction of the platoon commander, they are numbered, throughout the entire company, from right to left, and a disposition report and sketch submitted by each platoon. These reports are combined by the Company Commander and submitted to Battalion Headquarters. This numbering of the sentries throughout the company is quite a help in describing any point as it is sufficient to say, " Front line between posts 5 and 6." In some battalions the companies have small tin sign-boards painted and place these on the firing step. Of course they are taken out of the line when the company goes. The advantage of these signs is that when platoons relieve each other, in the same company, there is no danger of any of the positions being changed.

Trench Routine.—All troops " stand to " at one-half hour before dark or dawn, as the case may be. This is done for a number of reasons, some of which are as follows: (*a*) Because this is a good opportunity to check up the men and to see that there are no absentees. (*b*) Because this is a favorite time for an attack or raid. (*c*) Rifles can be inspected at this time. (*d*) After a man's rifle has been passed he can be given his rum. (*e*) Affords a good time to inspect the men's feet. This " stand to " is never neglected and is a most important function. All men and officers attend. As soon as it is dark enough at night the sentries put their heads over the top, but there is no sense in exposing the men until there is little chance of their being seen. It is not necessary to have the whole company on the firing step, the sentries are alone sufficient, and more men simply make a better target and if seen give the enemy accurate information as to the strength of our defenses. The remainder of the men stand in the trench with their *rifles in their hands*. This formation is a parade and the men must spring to attention when an officer comes into the bay if by doing so they do not expose themselves. This is the only time while in the trench that it is possible to enforce smartness to any degree, and should not be neglected. The support and sometimes the reserve line " stand to " at the same time that the front line does. The order to " stand to " can only be given by an officer and is usually done by the officer on duty at the time. The same thing applies to the " stand down " order which is given one-half hour after dark or daybreak. Inter-platoon reliefs take place after " stand down."

2. Men in the front line always wear equipment, less pack, and will always have their bayonets fixed.

3. All men carry their rifles and two bombs *whenever* they step off the firing step for any purpose whatever. There are very strict orders on this subject and it should never be disobeyed, as there are always long stretches of line that are unoccupied and sometimes the enemy has gotten in these places and captured men wandering along to a latrine, etc., without any weapons whatever. This rule is enforced during daylight as well as at night.

4. There should always be one officer on duty in the front line per company frontage, and at least one N. C. O. per platoon. Their duties are:

(*a*) To patrol the trench and see that everything is O. K. They must go fully armed and must always have a runner with them as a protection and a means of sending orders.

(*b*) Permit no one through the trench until satisfied of their identity.

(*c*) See that all sentries are properly alert and fully conversant with their work. The officer should have a short conversation with every man and endeavor to give the impression that he is interested in each one of them. If the sentry has anything to report, close attention should be paid, and if any action is taken the man should be told of it and the value of his information explained to him. In this way the sentries are encouraged to report what they see and much better intelligence work can be done. The men look forward to this brief talk with their officer and it does a great deal to foster that spirit of understanding and friendship between the officer and his men that stands an army in such good stead in all big offensives. The Germans lack this feeling and their morale has suffered greatly as a result.

(*d*) To see that there is no smoking during the night and that there is no smoke coming out of the dugouts during the days.

(*e*) To see that men do not go into dugouts while in the front line. This is the most dangerous place to be, for if a raid or attack comes over, the men in the dugouts are absolutely helpless and almost certain to be killed. Any man who has been into the German line on a raid and seen how the occupants of their dugouts are treated, does not have to be told to stay out of these front line traps.

(*f*) To control the fire of the trench. Men must not be allowed to fire unless there is a target. It is a certain sign of new and untrained troops to have a continuous sputter of rifle fire along the trench.

(*g*) To check all messages that come down the line.

(*h*) If "gas alert" is on to see that all the prescribed precautions are taken. It is now customary to wear the gas helmet in the alert position the entire time that the men are in the front line.

(*i*) To keep the ground in his immediate front under his personal observation as much as possible, and to keep a record of anything that he observers that will be of any use to the Intelligence branch. The last duty is badly neglected, with the results that much valuable information goes to waste.

(*j*) To generally supervise the firing of "Very" lights. As a rule, the officer on duty and the platoon sergeants have the "Very" pistols, with any remaining ones being given to the Lewis gun crews. The firing of lights should also be held down as much as possible, as they give away our posts and also indicate raw troops. Besides this, if the enemy sees a number of lights going up he knows that we have no patrols or other parties out in "No Man's Land" and will feel fairly secure. This is not good, for he should never feel secure.

(*k*) To visit all listening posts during his tour. Before going out he must be careful to warn the post by sending the prescribed signal over the tug wire.

(*l*) To send in the different reports called for during his tour of duty. Some of these reports are: Wind report (twice daily), Situation report (twice daily), Intelligence report (twice daily), Work report (once daily), Enemy shell report (twice daily), Casualty report (as they occur).

(*m*) To report to the company commander any unusual or suspicious occurrences. The officer on duty should use his own initiative as much as possible and not bother the company commander with unimportant details, but if there is anything important that turns up he should see that it is reported.

RATIONS.—Rations are brought up every night if the shell-fire will allow of it. The transport men must do their very best to get these rations up and it must be a very exceptional fire that prevents them from getting through. The rations parties are usually detailed every evening at "stand to" and immediately go out and meet the transport limbers at a prearranged place. Whenever possible the hot rations are cooked a little way behind the line and carried up by mess orderlies. When these rations arrive the officers want to prevent the men from gathering around them in a crowd, for this makes a fine Artillery target and many a platoon has been wiped out completely while getting rations. As soon as the cold rations get up they are divided and given to the men for them to take care of. The rum ration usually goes direct to the Battalion Headquarters and is there issued out to the representatives of the companies under the supervision of an officer. Sometimes it is advisable to carry twenty-four hours' rations when going into the trenches, as often the transport has difficulties until they get accustomed to the front. This is especially true in a front just before an offensive, where there is a large concentration of transport and probably heavy shelling.

WORKING PARTIES.—These parties are detailed as soon as possible to repair any damage done to the front by rain or shell fire. The front line troops are responsible for the repair of the front line. It is necessary to be continuously at work on the front line. The parties for repairing the support and reserve lines will usually be detailed by the troops in support and reserve, though the support troops do most of the work.

The unit in the front line is responsible for the front line wire and will find that there is always a large amount of work to be done. This wire must never be neglected and even if strong, should be made stronger, if possible.

Some battalions have a "Works" officer who has charge of all the work done by the battalion and who runs all the work rosters, but in any case the Company Commander is responsible for the condition of his own trenches and his wire.

Note: Rum issue takes place after "stand down" in the morning and is one of the most important things of the day and must be carefully supervised by the officers. With dry socks and a good issue of rum; the men go to their dugouts for their sleep without fear of catching cold.

DUTIES OF COMPANY COMMANDER IN TRENCHES.—

1. He is responsible in every way to Battalion Headquarters for the safety and condition of his frontage.

2. He decides what work is required and sees that it is done.

3. He is responsible for all reports to Battalion Headquarters.

4. He must satisfy himself that all ranks understand the different defense schemes and how to act under any circumstances that may arise. These defense schemes are usually turned over on relieving, but if none are turned over it is up to the incoming commanding officer to draw up one and submit it to his Battalion Commander for approval. If one is turned over it must be checked up and studied.

5. If "gas alert" is on he must see that all the necessary precautions are taken.

6. Make arrangements for rations and water and look after the comfort of the men as far as possible.

7. Always see that he has good communications with Battalion Headquarters, his flanks and with the Artillery.

8. He is responsible that the S. O. S. signals are in place and in good condition, and that all ranks know what they are. A sentinel is posted at the entrance of Company Headquarters and is responsible for the firing of these signals. He must be well trained in his work and a very dependable man. Since the S. O. S. rockets are in the support line and often a runner is the only means of communication between the front and the supports, it is well to have some quicker method of getting off the S. O. S. A method that has proved satisfactory is to have the officer on duty, in the front line, fire a colored Very light straight back towards Company Headquarters, this cannot be mistaken by the sentinel and are his orders to fire the S. O. S.

PROTECTION IN THE TRENCHES.—

By day	Sentries.
By night	Sentries (doubled). Listening Posts. Patrols.

1. At all times one officer per company and one N. C. O. per platoon are on duty in the front line.

2. A proportion (one-half) of the Lewis Gunners are always on duty.

3. There are usually three men told off to each sentry post. One of these men is actually on duty as

a sentinel, one is sitting at his feet on the firing step and must be awake and the third may be asleep on the firing step, but must be within touch of the other two. The third man should never be allowed in a dugout under any circumstances. Reliefs take place according to the state of the weather, in the coldest weather, say about once every hour.

The number of the sentry posts is doubled at night if possible. During the day there is normally about three posts per platoon, while at night about six. Often one platoon per company will hold the line during the day and three during the night, unless there is a strong point to be held. If a strong point is in the company frontage, it may be manned by a platoon from the support troops or may have one of the front line platoons assigned to it. The reason for having only one platoon in the front line during the day and three during the night is that there is little danger of attack or raid in daylight, not without artillery fire to cut the wire at any rate, and because most of the work is done at night. If the enemy's artillery opens up on our wire in the daytime it is all the warning we need. At night a small enemy party might worm its way through the wire and capture a post out of a weakly manned trench. This would be impossible in daylight. This inter-platoon relief allows of every man getting plenty of sleep in a close support line dugout. As a rule there is no heat in these dugouts, but one blanket and overcoat and the issue of rum will keep the men from feeling the effect of the cold for their period in the line.

In normal conditions a unit may stay in the front line system (front line, close support and maybe reserve) for about seven days. It will then move back to Brigade support, which may be about 1500 yards to the rear and the men may either have to live in a trench or in the cellars of houses. During the seven days in this position every man will be sent up about 6 hours a day or 9 hours at night, maybe as far as the close support line on working or carrying parties. It often happens that there are more casualties in Brigade Support than in the front line. This is due to carrying and working parties being often in the open and being caught by artillery or machine-gun fire. After a week in this position the unit will go for a week into Divisional Reserve or "Rest Billets." During this time the men are given intensive close-order drill, regulations regarding dress, etc., are rigidly insisted upon, and the training for offensive action is perfected.

The duties of a front line sentry are:

1. To watch his front (periscope by day and looking over the top at night).

2. Stop all irregularities in his own trench (men without equipment, fires, loud talking, smoking, loud stamping of the feet in cold weather, etc.).

3. To challenge all persons passing down the trench. This is often neglected and sooner or later the unit suffers severely for their laxity. Every man *must* be challenged at each post and the sentry must not play about it, but must treat each man as an enemy. The sentry's life will pay the forfeit if he is not on the job

and an enemy raiding party comes along, as they may do any night on a front held by a weak battalion.

4. To see that all messages are passed on.

5. To report anything unusual that he sees or hears, *at once,* to the platoon N. C. O. or to the officer on duty. If he thinks that his information is of importance he should put his relief on duty and look for the officer.

Division of Troops and Duties.—

1. Front Line.
2. Supports.
3. Reserves.

The way a Battalion is divided up depends on the local conditions. In all cases one company is kept as a Battalion Reserve, generally situated close to the Battalion Headquarters, which may be from 400 to 1000 yards behind the front line. In some cases the remaining three companies will occupy the front line, finding their own supports. Each company may have one platoon in the line during the day and three at night, or may have two at night and two during the day. Sometimes when there is a strong point to be manned one platoon will be placed in it for the entire tour. In other cases there may be only two companies in the front line and the other in dugouts in the support line. The duties of the front line troops are to hold the line at all cost. They are responsible for working on and improving their own line. The supports will reinforce the front line when necessary and in that case come under the command of the commander of the front line troops, regardless of the respective ranks of the two commanders. They are responsible for the condition of their own trenches and may be called upon for working parties for the front line.

Men in "Strong Points" will not reinforce the front line, but will hold out at all costs, even if surrounded. This is a sacrifice position and must hold up the advance so as to give the troops in rear time to get organized and form up for a counter-attack.

The primary duty of the Battalion Reserve is to launch an immediate counter-attack if the front line is penetrated and drive out the enemy before he has time to consolidate. There is also a Brigade and a Divisional Reserve formed of complete units, which will deliver the deliberate or prepared counter-attack.

COMMUNICATION IN THE TRENCHES.—The Company Commander has the following means of communication at his disposal:

1. Telephones (worked by Company Signallers).
2. Runners (4 per Company).
3. Carrier Pigeons.
4. Colored Rockets (Artillery S. O. S.).
5. Visual Signalling (Shutter, Lamp, Flag, or Ground Panel).

1. *Telephones.*—Telephone lines should be continually tested to see that they are in good order. Communication should be kept up by this means between:

Our trenches and Battalion Headquarters; our trenches and trenches on the flanks; our trenches and Artillery either via Battalion Headquarters, or direct line. This means of communication is very likely to fail at the critical time, due to the lines being cut by shell-fire.

2. *Runners* (*Most Important*).—This is the only satisfactory means of keeping up communications after the wires are cut. When in a trench this is not such a waste of life as in an attack, and the runner takes little more risk going back than by staying in the front line. It is a slow way to get the information back but fairly sure if duplicate messages are sent. The four company runners should know perfectly all the routes back to Battalion Headquarters and the Company Headquarters on the flanks. They should also know the best way to the different trench-mortar batteries.

3. *Carrier Pigeons.*—These pigeons do 48 hours' duty in the front line and are then exchanged for others. They are in the care of special men who do nothing else. They must not be fed in the trenches. This means of communication is only used when all other means fail.

Note: It is very difficult to get a message passed properly in the front line and this method can not be relied upon. The sentry posts are so far apart and the men are usually so imperfectly trained in this work that it should not be tried. If a message must be passed along it is best to have the N. C. O. on duty take it to the next N. C. O. and then have him carry it to the next, etc.

CHAPTER VIII

NOTES ON USE OF PRISMATIC COMPASS

THE prismatic compass in the hands of a man who knows how to use it is one of the most deadly weapons we possess. If it comes to a choice of whether to take a compass up to the line or an automatic revolver, the compass should win out. The data obtained from using this instrument will cause more Germans to be killed than you could hope to kill with a revolver in the rest of your life.

In buying a compass you must be certain to get one that can be *read at night*. A number of firms in this country are selling a compass that they call a night compass, but this is a misnomer. It is true that you can use it for night marching, but it is impossible to take a sight with it and to read the bearing. As your most efficient work will be done at night, it is imperative that you secure the proper kind of compass.

The best form is one made by F. Baker and Son, 12 Clerkenwell Road, London, and is their *1910 Model.* This instrument is exactly like other military prismatic compasses, except that the outer dial is made of some *translucent* material and has a patch of illuminous paint under the dial just below the prism. For day reading the opaque scale A is used; for night reading the translucent scale B is read (see Fig. 18, A). With the eye *close* to the eye-piece both scales can be seen at once.

To read the compass, in daytime, turn up the prism as in C, lift the cover and then hold the compass by the ring, with the right hand. Now keeping the dial horizontal, raise the instrument to one eye. In order to read, the prism must be placed so close to the eyes that the eyelid is touching the metal. Then on closing the other eye both dials can be seen, through the glass prism, and also a view of the object sighted at can be obtained through the slit X (Fig. A). The compass is turned until the hairline in the cover is in the centre of the slit X and cuts the object sighted at. The dial is then allowed to come to rest and the angle read. This is the magnetic bearing of the object.

By magnetic bearing is meant the angle, ***measured clockwise,*** made by a line drawn from the observer, in the direction of the magnetic north and a line drawn from the observer to the object (Fig. 19, A).

To read this same angle at night the luminous line on the lid is turned around until it covers the hairline. Then the compass is sighted as before, the only difference being that the luminous line is directed towards the flashes from the enemy machine gun, or whatever you are getting the bearing of, and the figures on the translucent dial are read, by means of the glow from the daub of luminous paint directly below the figures.

Another use for this compass is to maintain your direction in night marching. First you determine from a map, as explained later, what bearing you wish to march along and then set the compass. In Fig. 18, C, will be noticed, around the side of the compass, a set of figures. These indicate degrees. The zero is at C (Fig. A) where the cover is hinged to the body, and the largest figure is 36, the numbering being *counter-clockwise.* Therefore each full division is 1/36 of a circle, or 10 degrees, and each of the half divisions 5 degrees. In the milled edge of the metal ring which surrounds the glass over the dial will be noticed a line marked in Fig. C, "zero mark for night marching." The ring is rotated until this line is opposite the degree desired. The small pot of luminous paint on the glass over the dial (Fig. A) is directly above this zero line and turns with it. Now suppose the desired bearing is 240° the angle "M" (Fig. A) will be 240°, since the pot is opposite the 240° mark and this mark is put on by measuring *counter-clockwise* from "C." In Fig. A the arrow N is directly over the needle and is painted on the dial with luminous paint. If now the compass be turned until the arrow N is pointing to the pot of paint D, the line E D will be pointing towards the magnetic north, while the line E C will be pointing 240° from magnetic north, *measured clockwise.* This is then the direction of the required bearing and as E C is simply a continuation of the luminous line on the cover, all you have to do is follow the direction that this luminous line points and you will be moving in the desired direction.

MAGNETIC VARIATION.—Before giving examples as to how the compass may be used it is necessary to explain magnetic variation. In most text-books this very simple thing is so obscured by complicated scientific phraseology and rules as to get a beginner completely confused. Don't try to remember rules, for under fire you will forget them. Just get in your mind a picture of what this variation is and no confusion can ever again exist. Study the sketches here given then close the book and explain the whole thing over to yourself, drawing the little sketches, using different angles. The following description may not be scientific, but is simple and has succeeded in teaching privates, with no education, this easy little proposition, that sometimes confuses engineers.

In the first place there are two norths considered in map work. The true north (North Star or North Pole) and the magnetic north (where a compass points). It so happens that these two points are not the same. There is no reason that a needle should point to the North Pole, but there is a very good reason why it should point to the magnetic north, which is some form of metal deposit that attacks a magnetized needle. Now if you draw from where you are standing a line to the North Pole and another to the magnetic north, the angle between these two lines is the magnetic variation for the point at which you are standing. It is evident that, as you move from one part of the earth's surface to another, this angle will change (Fig. 19, B) and this is the reason why there is a different variation marked on each map. The variation may be either easterly or westerly, according to which side of the true north line the magnetic north line falls. If from where you are standing the magnetic north is to the east of the true north the variation is called easterly.

Although this variation is different for different parts of the world, the change is so gradual that on any one sheet of a map the magnetic variation may be considered the same. The local variation is marked on the border of all maps.

Where this angle comes into play, in military work, is in trying to draw on a map a bearing read on a compass or in setting on a compass a bearing measured off a map. *Maps are made with reference to the true North. All angles read on a compass refer to the magnetic North.* It is therefore necessary to be able to convert from one to the other. This is so simple that it would not be necessary to show it if it were not for the fact that so many men make mistakes, first because they think it is hard and second because they do not really know what angle is meant by magnetic variation, as explained above.

Suppose you were "putting" a shot during a field day. After the put the distance is taped to where your shot fell. Now suppose another man should put from ten feet in front of you and his shot fell the same place yours did. It is not necessary to re-measure the distance. All that is necessary is to subtract ten feet from your put. That is the whole problem of converting from magnetic readings to true.

Suppose the variation at the place you are is 10° West (see Fig. C). Suppose you want to measure the bearing, of "Oo," with a compass and then plot this bearing on a map. When you read the compass while sighting at "O" you read the angle MXO, M being the magnetic North. You read this angle because your compass needle points to M and your dial is zero over the needle. What you are trying to get is the true bearing TXO, T being the true North. You want this bearing because the map you desire to plot the bearing upon is made with reference to true North. Now just remember the little grammar school problem mentioned above. Measuring from M to O with the compass you have gotten the distance, in degrees of your "shot put." You know the distance in degrees, from M to T, which is the magnetic variation and is given on the border of the map. You want the distance from T to O in degrees. Simply subtract the 10° that is the difference between the two angles.

In case "O" is in another quadrant, such as is shown by O, the method is exactly the same, since the bearings are measured from 0° completely around to 360° and do not take any account of east, south or west right angles.

If it is desired to measure a bearing off of the map, in order to march on it the conversion can be made just as easily as before. In this case you start out and take a *true* bearing off of the map (maps are made with reference to true north). Before trying to follow the bearing, by using your compass, it must have been converted into a magnetic bearing (compass needle points to magnetic north):

(*a*) You *want* magnetic bearing (M X O).
(*b*) You *have* true bearing (TXO).
(*c*) *You have* magnetic variation (TXM).

$$MXO = TXO + TXM \text{ (see Fig. C).}$$

So far only a westerly variation has been considered. If this variation is easterly the principals are exactly the same, though the arithmetic is a little different.

To get a true bearing from a magnetic bearing you have taken on the compass (see Fig. D):

(*a*) You *want* true bearing (TXO).
(*b*) You *have* magnetic bearing (MXO).
(*c*) You *have* magnetic variation (TXM).

$$TXO = MXO + TXM.$$

To get a magnetic bearing from a true bearing you have measured off your map:

(*a*) You *want* magnetic bearing (MXO).
(*b*) You *have* true bearing (TXO).
(*c*) You *have* magnetic variation (TXM).

$$MXO = TXO - TXM.$$

This is all there is to know about magnetic variation in-so-far as it concerns a soldier in the field. Don't try to memorize the above. Work it as an arithmetic problem and not as a lesson in poetry to be memorized, as so many men try to do and then forget the whole thing when they want it.

In order to get results from a compass an officer must be able to also use a protractor. Nearly everyone has used one of these and even if they haven't a moment's inspection of the instrument will make its use evident to anyone. After getting the bearings on the compass the protractor is used to measure out the angle when drawing it on the map or conversely to measure the angle on the map before setting it on the compass. The protractor should be transparent and should have a long string through the centre point, so as not to make it necessary to draw pencil lines on the map. It is a good idea to have small cross-sections etched on the protractor for use in finding the smallest coördinates of a point, when using map squares for location (see Fig. 19, E). These cross-sections should be put on for scales of 1/10,000, 1/20,000 and are a great help, as these are the only lines not actually drawn on a map. Along the centre line it is advisable to have a scale of inches on one side and centimetres on the other. These markings can be put on by the owner himself. When placing the protractor on the map the line through the centre and the zero degree mark is placed north and south on the map. The grid lines on the map are a guide to this direction. It is easier to get this line parallel to the grid lines if there are a couple of fine lines drawn on the protractor about one-half an inch on each side of the centre-zero line and parallel to it.

The main use for the prismatic compass is to locate enemy batteries, machine guns, trench mortars, snipers, observation posts, etc., etc. By locating is meant finding the map location of the object seen.

If you take a reading on the compass and then draw a line on the map, *through the point where you were standing at the time,* making the same angle, corrected for variation, with the north that you read, the position of the object will be somewhere on this line. If now you have taken a second reading from some other point to the flank and draw a second line, the position of the object will be where these two lines intersect. If more bearings can be taken the intersections will probably form a polygon and the centre of this polygon will be a more accurate location than the intersection of two bearings.

Very often it is only possible to get one bearing. If the object is in a trench where the line representing the bearing crosses the trench is the required position. The trench will be accurately shown on the ordnance maps, which are made from air photographs. If only one bearing is taken and the object is not in a trench a range finder may be used, if one is available. Sometimes it is possible for a good observer to judge from the contour of the country or from the relative position to houses, etc., what point on the line is the required one.

Even if it is impossible to actually locate the object, take one bearing any way and hand it in, *telling your own position when you took it.* Some other man may have taken a reading from another place or may do so a week later, and this, with your bearing, will give the required data.

Use your compass all the time. Record bearings on everything you see and get these bearings to the

Intelligence Officer. Just one bearing of yours may very well cause a machine gun to be put out, that would cause a hundred deaths a few weeks or months later. It is worth the trouble. It is at night that most opportunities for this work arise. At that time a gun firing gives a flash that you may see if it is not properly screened. Also it is safe to put your head above the parapet and take a deliberate reading on your night-reading instrument.

If it is desired to take a patrol to a certain spot in the enemy wire, say a gap, the night-marching apparatus comes in very useful. Measure the bearing (on the map), to the gap from some sap head or bombing post that is shown and correct for magnetic variation. Then set the compass and crawl from the sap head in the direction the luminous line points. You can get into a hole and sight the compass and then pick out some object in the indicated direction. Close the compass and proceed to this object. On arriving at the object sight again and continue this until you reach the gap. With care you can hit within a few yards of where you are going, while without the compass there is a good chance of your wandering around a good part of the night and then not finding the gap.

When out in " No Man's Land " and something is found that ought to be put on the map, take bearings, from a shell-hole, on two or more objects in the back area that you know are on the map. When these bearings are drawn on the map, *through the points you sighted upon,* their intersections will represent the points where you were when you took the bearings. These readings can be recorded by writing them in a note-book (*with no other data in it*). It is possible to write down figures in the dark which can be deciphered later.

A unit can march in line, at night by setting two compasses exactly alike on the bearing you want to march upon, and giving one compass to a man on one flank and the other to a man on the other flank. This will keep your unit from getting spread out to any extent.

This chapter is only a very sketchy outline of the subject and is given simply to guide you to think in the right direction. With a compass and map before you, you can easily think out the entire subject for yourself.